THE ATHENÆUM

Journal of English and Foreign Literature, Science, the Fine Arts, Music and the Drama.

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SOCIAL SCIENCE CONGRESS, ABERDEEN, SEPTEMBER 19 to 26.

President—The Right Hon. the EARL of ABERDEEN.

Presidents of Departments:—International and Municipal Law, the Hon. Lord Gifford, a Judge of the Court of Session—Repression of Crime, the Right Hon. the Lord Advocate—Education, the Right Hon. Lord Young—Health, Edwin Chadwick, Esq., C.B.—Economy and Trade, James Caird, Esq., C.B. F.R.S.—Art, the Lord Ronald Leveson Gower—Council, George Woodyatt Hastings, Esq.

Information as to Papers and other particulars may be obtained at the Offices, 1, Adam-street, Adelphi, London, or City-buildings, Aberdeen.

LEEDS MUSICAL FESTIVAL, 1877. TOWN HALL, LEEDS. WEDNESDAY, THURSDAY, FRIDAY, and SATURDAY, September 19th 20th, 21st, and 22nd, 1877.

Conductor—Sir MICHAEL COSTA.

Principal Vocalists.

Mdlle. ALBANI, Madame EDITH WYNNE, Mrs. OSGOOD, Madame PATEY, Mdlle. REDEKER, Mrs. MUDIE-BOLINGBROKE, Mr. EDWARD LLOYD, Mr. WM. SHAKESPEARE, Mr. SANTLEY, Mr. CECIL TOVEY, and Signor FOLI.

BAND and CHORUS of 400 PERFORMERS.

Organist—Dr. SPARK. *Chorus Master*—Mr. BROUGHTON.

Outline Programmes.—WEDNESDAY—'ELIJAH.' Evening—'The FIRE KING (New Cantata), by Walter Austin, and Miscellaneous Selection. THURSDAY—Mendelssohn's 'WALPURGIS NACHT,' Beethoven's SYMPHONY (No. 8), and Miscellaneous. Evening—'SOLOMON.' FRIDAY—'JOSEPH,' by G. A. Macfarren (written for this Festival). Evening—Raff's SYMPHONY in G Minor, and Miscellaneous. SATURDAY—Bach's 'MAGNIFICAT in D,' Mozart's 'REQUIEM,' and Beethoven's 'MOUNT of OLIVES.'

Front Seats and Gallery Tickets (Reserved) at the Festival Offices.
Serial Ticket for the Seven Performances (transferable), 2*l.* 2*s.*
Single Ticket, Morning .. .. 1*l.* 1*s.*
Ditto Evening .. .. 15*s.*
Second Reserved Seat Tickets only at HOPKINSON BROTHERS & Co., Commercial-street.
Morning .. .. 10*s.* 6*d.*
Evening .. .. 7*s.* 6*d.*

Full Festival Programmes may be had gratis at the Festival Offices, and at the Music Warehouses.

JOHN WM. ATKINSON, FRED. R. SPARK, } Hon. Secs.

Festival Offices, Great George-street (Town Hall), Leeds.

NEW BERNERS CLUB, for LADIES, 64, Berners-street, Oxford-street, W.—Annual Subscription, 1*l.* 1*s.* No Entrance-Fee before the 1st of October. The Secretary attends Mondays, Wednesdays, and Fridays, from 2 till 4 P.M.—Prospectuses sent by post.

ART EXHIBITION, WARRINGTON.—The NEW ART GALLERY of the WARRINGTON MUSEUM will be OPENED in SEPTEMBER, with an Exhibition of Paintings, Sculpture, and other Works of Art.—Artists and others wishing to contribute may obtain particulars from Mr. C. MADELEY, The Museum, Warrington. Mr. J. BOURLET, 17, Nassau-street, Middlesex Hospital, W., acts as Agent in London.

CRYSTAL PALACE PICTURE GALLERY.—OPEN all the YEAR ROUND for the RECEPTION and SALE of PICTURES, by the British and Foreign Schools.—For particulars apply to Mr. C. W. WASS.

NIEMANN'S GREAT WORKS, 'Shakspeare's Cliff,' 'Richmond,' 'Trampers Crossing a Moss,' and 'Scarborough,' together with a choice Collection of his finest Cabinet Pictures (Landscapes and Marine Pieces), are NOW ON VIEW, for a short time only, in SHEPHERD'S PICTURE GALLERY, Angel-row, Nottingham.

TO ART TEACHERS.—At the MANCHESTER SCHOOL of ART there is a VACANCY for the post of SECOND MASTER. Salary, a minimum of 140*l.*, and a proportion of the Government payment on results. Applicants must hold at least a First Third Grade Certificate, and should state if and where they have been engaged as Teachers.—Address, with full particulars, Mr. EDWIN W. MARSHALL, Sec., School of Art, Manchester.

AN ARTIST, an Exhibitor for Thirty Years at the Royal Academy, is willing to go into the Country with a Lady or Gentleman to PAINT LANDSCAPES and FIGURES with them, or for them. Lessons in Oil or Water Colour.—For terms, apply by letter, Z., care of Mr. Rust, Stationer, Devonshire-terrace, Turnham Green.

THE RESTORATION of PAINTINGS, or any WORK necessary to their PRESERVATION, effected with every regard to the safest and most cautious treatment, by MATTHEW THOMPSON, Studio, 25, Wigmore-street, Cavendish-square.

TO ARTISTS.—TO BE LET, for Six or Eight Months, a COTTAGE RESIDENCE, well Furnished. Three Sitting Rooms, one 25 by 27 feet, with skylights; Five Bed Rooms and Bath Room; Stable and Coach House. 15 miles from London, close to the river and railway. Terms, 100*l.* for Six Months; not to be Let for a shorter period.—Apply to C. C., care of Messrs. Drewett & Son, Estate Agents, Weybridge, Surrey.

TO BE LET, TWO GOOD STUDIOS, High and Lofty, Gas and Water laid on, suited for SCULPTOR or PAINTER (one Furnished), in the neighbourhood of Regent's Park.—Apply, by letter, to C. H. L., care of Captain Jarvis, 37, Oakley-square, N.W.

SPECIAL NOTICE.—The SCOTTISH KOH-I-NOOR, unique White Aquamarine from Perthshire, is for a short time ON VIEW, on presentation of Card, at the MINERALOGICAL and GEOLOGICAL MUSEUM of BRUCE M. WRIGHT, F.R.G.S., &c., 90, Great Russell-street, Bloomsbury, London, W.C.

SCHOLARSHIPS in SCIENCE. ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.

TWO SCHOLARSHIPS, each of the value of 105*l.*, open to Students who have not entered at any London Medical School, will be OFFERED for COMPETITION on SEPTEMBER 26. Subjects:—Zoology, Botany, Chemistry, Physics. One Scholarship will be awarded to a Candidate (if of sufficient merit) under 20 years of age; the other is limited to Candidates under 25 years of age.

An EXHIBITION of 50*l.* in the same Subjects, and one of 40*l.* in the Subjects of Preliminary Education, open to Students who have entered the Hospital in October, WILL BE COMPETED FOR in THAT MONTH.

For particulars apply, personally or by letter, to the RESIDENT WARDEN of the College, St. Bartholomew's Hospital, E.C.

ST. BARTHOLOMEW'S HOSPITAL and COLLEGE.—The WINTER SESSION will begin on MONDAY, October 1st. The Clinical Practice of the Hospital comprises a service of 710 Beds, inclusive of 34 Beds for Convalescents at Highgate. Students can reside within the Hospital Walls, subject to the College Regulations.—For all particulars concerning either the Hospital or College, application may be made, personally or by letter, to the RESIDENT WARDEN of the College. A Handbook will be forwarded on application.

LONDON SCHOOL of HOMŒOPATHY, 52, GREAT ORMOND-STREET, Russell-square, W.C.

President—The Right Hon. LORD EBURY.

Bankers—Union Bank of London, Argyll-place.

The WINTER SESSION will open on TUESDAY, October 2nd, with an INTRODUCTORY ADDRESS, at Five P.M., by Dr. R. HUGHES.

LECTURES.

On Materia Medica and Therapeutics, Dr. Richard Hughes.
On Principles and Practices of Medicine, Dr. D. Dyce Brown.
Clinical Lectures (within the Wards of the Hospital), by Dr. J. Galley Blackley and Dr. D. Dyce Brown.
Clinical Lectures on Surgery, by Dr. James Jones.
Clinical Lectures on Diseases of the Ear, by Dr. Cooper.

The Hospital contains 65 Beds.

Contributions are requested in aid of the Funds of the Hospital and for the general purposes of the School.

For further information as to Fees, Free Admission, &c., apply to Dr. BAYES, Hon. Secretary, or to FRED. MAYCOCK, Secretary.

KING'S COLLEGE, LONDON.—INDIAN CIVIL SERVICE EXAMINATION, 1878.—SPECIAL CLASSES (supplementing the Ordinary Lectures) will begin, OCTOBER 8th, in the English Subjects (Prof. Sir R. Gardiner, M.A., J. W. Hales, M.A., and R. F. Charles, M.A.), Greek and Roman History, &c. (G. C. WAIT, M.A., French (Prof. Mariette, M.A.), German (Prof. Buchheim, Ph.D.), and the Science Subjects by the Professors of the applied Science Department.

For Prospectus apply, personally or by post-card, to J. W. CUNNINGHAM, Esq., King's College, London. Letters may be addressed to G. C. WARR, Esq., Tutor of the Indian Civil Service Department.

KING'S COLLEGE, LONDON.—SCIENCE DIVISION.—This Division is established with a view to meet the requirements of the new regulations for the B.Sc. and Prel.Sc. Examinations of the University of London, of the Indian Civil Service, the Indian Public Works Departments, and other Science Examinations.

Students will be admitted on TUESDAY, October 2.

The Course of Instruction includes Mathematics, Mechanics, the Physical Laboratory, Chemistry, the Chemical Laboratory, Zoology, Botany, Practical Biology, and Geology.

For the Prospectus apply, personally or by post-card, to J. W. CUNNINGHAM, Esq., King's College, London, and letters may be addressed on the subject to Professor W. G. ADAMS.

KING'S COLLEGE, LONDON.—MEDICAL DEPARTMENT.—The INTRODUCTORY LECTURE will be given on MONDAY, October 1, by Professor Lister, F.R.S., at 4 P.M.

The following ENTRANCE SCHOLARSHIPS will be given in OCTOBER NEXT, viz.:—

Four on the Warneford Foundation, viz.: Two of 75*l.*; and Two of 50*l.*, for previous education in General Literature and Science.

One by the Clothworkers' Company of 100*l.* for proficiency in Science only.

During the ensuing Session there will be awarded FIVE MEDICAL SCHOLARSHIPS, viz.:—One of 80*l.*, One of 50*l.*, and Three of 20*l.*, for professional proficiency. One for Chemistry, of 40*l.*; One of 50*l.*, for Resident Students only; and Two Sambrooke Registrarships of 50*l.* each.

Endowed Prizes of the value of 80 Guineas, and College Prizes of the value of 60*l.*, are awarded annually.

For Prospectuses apply, personally or by post-card, to J. W. CUNNINGHAM, Esq., King's College, London. Letters requiring further information may be addressed to Professor BENTLEY, Dean of the Department.

UNIVERSITY HALL, GORDON-SQUARE, LONDON, W.C.—STUDENTS of UNIVERSITY COLLEGE reside in the Hall under Collegiate discipline.—Particulars as to Rent of Rooms, Scholarships, &c., may be obtained on application to the PRINCIPAL or the SECRETARY, at the Hall.

UNIVERSITY COLLEGE, BRISTOL.

ONE CHEMICAL SCHOLARSHIP of 25*l.*, and THREE GENERAL of 15*l.* each, open to Women as well as Men, will be offered in OCTOBER NEXT.—For particulars, apply to EDWARD STOCK, Secretary.

SCHOLARSHIPS for WOMEN.—FOUR or more, of 15*l.* to 50*l.* each, will also be offered by the Clifton Association for the Higher Education of Women.—Further particulars may be obtained from Miss C. WINKWORTH, 21, Victoria-square, Clifton, or from the SECRETARY, as above.

THE LONDON INTERNATIONAL COLLEGE, Spring-grove, near Isleworth, W. English, French, and German taught to every Boy, in addition to Mathematics, Classics, and Natural Science. Each Boy has a separate Bed-room.

Terms 70, 80, and 90 Guineas. A reduction for brothers.

The NEXT TERM COMMENCES on TUESDAY, September 18th.

Apply to the Head Master, H. R. LADELL, M.A.

BEDFORD COLLEGE (for LADIES), 8 and 9, York-place, Portman-square.—The SESSION 1877-78 will begin on THURSDAY, October 11.—TWO ARNOTT SCHOLARSHIPS will be awarded by Open Competition in October next. Candidates to send their names to Miss MARTINEAU, at the College, before September 20th.

Prospectuses, with particulars of scholarships, boarding, &c., to be had at the College. H. LE BRETON, Hon. Sec.

BRIGHTON COLLEGE.—Mr. JAMES H. DAVIES, M.A. Oxon. F.C.S., Lecturer on Natural Science, and Assistant Classical Master at Brighton College, receives BOARDERS at 126, Eastern-road.

THE BRIGHTON COLLEGE.

Principal—The Rev. CHARLES BIGG, D.D., late Senior Student and Tutor of Christ Church, Oxford.

Vice-Principal—The Rev. JOSEPH NEWTON, M.A.

The NEXT TERM commences on TUESDAY, September 18th.

OWENS COLLEGE, MANCHESTER.

Principal—J. G. GREENWOOD, LL.D.

I. DEPARTMENT OF ARTS, SCIENCE, AND LAW.

Greek—J. G. Greenwood, LL.D. (Cambridge), (Fell. Univ. Coll., Lond.).
Latin, Comparative Philology—A. S. Wilkins, M.A. (Camb.), (Fell. Univ. Coll., Lond.).
English Literature, History—A. W. Ward, M.A. (Fell. St. Peter's Coll., Camb.).
English Language—T. Northcote Tollet, M.A. (late Fell. Christ's Coll., Camb.).
Mathematics—Thomas Barker, M.A. (late Fell. Trin. Coll., Camb.).
Natural Philosophy, Physical Laboratory—Balfour Stewart, LL.D. F.R.S.; Thomas H. Core, M.A.
Civil and Mechanical Engineering, Geometrical and Mechanical Drawing—Osborne Reynolds, M.A. F.R.S. (Fell. Queen's Coll., Camb.).
Logical, and Mental and Moral Philosophy, Political Economy—Robert Adamson, M.A.
Jurisprudence and Law—Alfred Hopkinson, M.A. B.C.L. (Stowell Fell. Univ. Coll., Oxford).
Chemistry and Metallurgy—H. E. Roscoe, B.A. Ph.D. F.R.S.
Organic Chemistry—C. Schorlemmer, F.R.S.
Animal Physiology and Zoology, Vegetable Physiology and Botany—W. C. Williamson, F.R.S.
Physiology and Histology—Arthur Gamgee, M.D. F.R.S.
Geology and Palæontology—W. Boyd Dawkins, M.A. F.R.S.
Mineralogy—Charles A. Burghardt, Ph.D.
Oriental Languages, German—T. Theodores.
French Language and Literature—J. F. H. Lallemand, B ès Sc.
Free Hand Drawing—William Walker.
Harmony and Musical Composition—Edward Hecht.

With Assistant Lecturers and Demonstrators in all the principal subjects.

II. DEPARTMENT OF MEDICINE.

Dean of the Medical School—ARTHUR GAMGEE, M.D. F.R.S.

WINTER SESSION.

Physiology and Histology—Arthur Gamgee, M.D. F.R.S.
Anatomy, Descriptive and Practical—Morrison Watson, M.D. F.R.S.E.
Comparative Anatomy—W. C. Williamson, F.R.S.
Chemistry—Henry E. Roscoe, B.A. Ph.D. F.R.S.
Organic Chemistry—C. Schorlemmer, F.R.S.
Clinical Medicine—William Roberts, M.D. F.R.P.
Principles and Practice of Medicine—J. E. Morgan, M.D. M.A. F.R.C.P.
Surgery—Edward Lund, F.R.C.S.
Practical Surgery—Samuel M. Bradley, F.R.C.S.
General Pathology and Morbid Anatomy—Henry Simpson, M.D.; Julius Dreschfeld, M.D. M.R.C.P.
Hospital Instruction—The Physicians to the Royal Infirmary; the Surgeons to the Royal Infirmary.

SUMMER SESSION.

Practical Physiology and Histology—Arthur Gamgee, M.D. F.R.S.
Obstetrics—John Thorburn, M.D.
Materia Medica and Therapeutics—Alexander Somers, M.R.C.S.; Daniel Jno. Leech, M.D. M.R.C.P.
Medical Jurisprudence and Public Health—Arthur Ransome, M.D. M.A.
Practical Morbid Histology—Julius Dreschfeld, M.D. M.R.C.P.
Ophthalmology—Thomas Windsor, M.R.C.S.
Practical Chemistry—Henry E. Roscoe, F.R.S.
Botany—W. C. Williamson, F.R.S.

Assistant Lecturers and Demonstrators.

Anatomy—Alfred H. Young, M.B.
Physiology—John Priestley.

The Lectures in Anatomy, Physiology, and Chemistry are recognized by the University of Edinburgh, and attendance upon any two of these courses for six months will count as one of the Winter Sessions required by the University for the M.B. degree.

III. DEPARTMENT OF EVENING CLASSES.

Classes conducted by the Professors and Lecturers of the College, and external Lectures are held during the Winter Months in nearly all the Arts and Science subjects.

The NEXT SESSION will COMMENCE:—In the Arts, &c., Department, on the 2nd October; in the Medical Department, on the 1st October; and in the Evening Classes, on the 15th October.—Candidates for admission must not be under fourteen years of age; and in the Arts and Science Department those under sixteen will be required to pass a preliminary Examination in English, Arithmetic, and Elementary Latin.

Prospectuses of the several Departments may be obtained from Mr. CORNISH, Piccadilly, and other Booksellers in Manchester; and at the College.

J. HOLME NICHOLSON, Registrar.

HIGH SCHOOL of EDINBURGH, SESSION 1877-78.

The SCHOOL RE-ASSEMBLES on MONDAY, 1st October.

The Edinburgh School Board have made arrangements by which a thoroughly practical as well as a thoroughly liberal education can be imparted. The Classes are strictly limited, and care is taken to give each boy that kind of culture of which he is most capable, and which is most necessary for him.

Full information is contained in the Report and Prospectus, which may be had on application to the JANITOR, at the School; to the Clerk to the Edinburgh School Board, 9, Castle-street; or to the principal Booksellers in Edinburgh.

HIGH SCHOOL OF DUNDEE.

WANTED, a LADY SUPERINTENDENT for the Girls' Department of this School, to take supervision of the Girls in the Class Rooms and School Grounds, and see to their conduct and comfort. Salary from 130*l.* to 180*l.* Candidates will be expected to have studied with a view to the Educational Profession, and had some experience in the management and training of girls.—Further information may be obtained from the Secretary, A. W. CUMMING, Solicitor, 1, Bank-street, Dundee, with whom applications must be lodged by 31st August current.

HEATH BROW SCHOOL, HAMPSTEAD.—

The SESSION (1877-78) BEGINS on WEDNESDAY, September 19th.

Classics and English Subjects, Rev. E. M. Geldart, M.A., and Mr. Arch. Ballantyne; French, —; French, Examiner in, Professor Charles Cassal, LL.D.; German, Rev. E. M. Geldart, M.A.; Mathematics and Natural Philosophy, John Bridge, M.A., London; Chemistry, Mr. H. Maiden, under the direction of Professor Barff, M.A.; Writing, C. F. King, B.A., London, Writing Master in University College School; Drawing, Mr. W. H. Fisk, Head Drawing Master in University College School; Gymnastics, Mr. A. Winterbottom.

For Prospectus of the new arrangements address Mrs. CASE, Heath Brow, Hampstead, London, N.W.

THE READING SCHOOL.

HEAD MASTER.

The CORPORATION of READING invite applications for the HEAD MASTERSHIP of the READING SCHOOL, which will become Vacant at the end of the present year, on the retirement at that time of the present Head Master.

The School (which was reconstituted under the powers of a special Act of Parliament and Scheme obtained in 1867, with a view of establishing in Reading a thoroughly efficient and useful School in succession to, but with a more enlarged scope than, its ancient Grammar-School) is a First-Grade School, with a large modern element.

The principal Block of School Buildings was erected in the year 1870, under the superintendence of Mr. Alfred Waterhouse, on a site in the Suburbs of the Town of Reading; and this Block comprises Two Masters' Residences, one at either end, a large Common Hall or School-Room in the centre, and various Class Rooms and Apartments for School purposes and for the use of the Boys.

Each of these Masters' Houses contains 30 separate Dormitories for Boarders, opening out of a Corridor, which communicates directly with the First Floor of the Master's House. In these Two Houses there is accommodation altogether for about 60 Boarders.

In the year 1873 an additional Residence for the Head Master, with 50 separate Dormitories for Boarders and other accommodation for more was erected.

There are a School Chapel, a Gymnasium, &c., within the School Grounds.

The entire School Buildings and Grounds, which have been carefully and suitably laid out and planted, comprise an area of about 12 acres.

A copy of the Act of Parliament and of the Scheme for the regulation of the School will be furnished to Gentlemen wishing to apply for the Office of Head Master.

The Head Master must be a Graduate of one of the Universities of Great Britain or Ireland.

There are Two Endowments payable to the Head Master; namely, a sum of 16*l.* per annum granted by a Charter of Queen Elizabeth, and a share in the income of an Estate given by Archbishop Laud, now amounting to about 45*l.* per annum.

The Head Master will have assigned to him, Rent free, the whole of the principal Block of School Buildings, including the Two Masters' Houses and Dormitories therein, he paying the Rates and Taxes and keeping the Buildings and School Grounds in tenantable and suitable repair and condition, and receiving for himself or Assistant Masters, as he may arrange with them, all profits from the Boarders residing therein other than Capitation Fees.

The Head Master will also have assigned to him the additional Master's Residence, erected in 1873, he paying the Rates and Taxes and keeping same in repair; but for this House he will be required to pay the same Rent as is paid by the present Head Master, viz., 40*l.* per annum, as arranged at the time of its erection. The Head Master will receive for himself all profits from the Boarders residing with him other than Capitation Fees.

Under the School Scheme the Head Master is entitled to Two-Fifths of all Capitation Fees received from Boys attending the School. The Trustees, however, have arranged with the present Head Master that he should receive Four-Fifths of the Capitation Fees, and also any Fees which may be paid for teaching French, German, and Drawing, and himself pay and provide all Assistant-Masters required for conducting the School.

The Capitation Fees payable under the Scheme are—for Boys under 14 years, a Fee not exceeding 10*l.* per annum; Boys of 14 and under 16, a Fee not exceeding 8*l.* per annum; and for Boys above 16 years, a Fee not exceeding 30*l.* per annum.

The numbers of Boys in the School at the end of the last Term were 106 Day Boys and 135 Boarders.

There is a sum of about 1,000*l.* now available for establishing Scholarships at the School.

All applications for the appointment of Head Master, accompanied by such testimonials as the Candidates may deem it expedient to submit for the Corporation, must be sent to Mr. HENRY DAY, Deputy Town Clerk, Town Hall, Reading, endorsed "Application for Head Mastership of the Reading School," on or before SATURDAY, the 29th of September next.

Any further information desired by intending Candidates may be obtained on application to the DEPUTY TOWN CLERK, Reading.

HENRY DAY, Deputy Town Clerk, Reading.

Town Hall, Reading, 20th August, 1877.

SCHOLASTIC.—The HEAD MASTERSHIP of an

important School will soon be VACANT. The minimum salary is 600*l.* a year and house-rent free. Salary will be increased, by capitation fees, up to 1,200*l.* a year. Large staff of Assistant-Masters, all University men. Candidates must be Graduates of OXFORD or Cambridge, in high Classical Honours, and have had good experience.—Further particulars on application to Messrs. ASKIN & GABBILAS, 9*a*, Sackville-street, London, W.

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Candidates for Woolwich, Sandhurst, and Commissions through the Militia.—Colonel BERDOE A. WILKINSON (Retired Full Pay), Royal Engineers, receives PUPILS to PREPARE for the ARMY, at his Residence in Hesse Darmstadt. They have the advantage of preparing for the Competitive Examinations under the superintendence of an Officer of long service, assisted by a Staff of competent Masters, and at the same time of acquiring a colloquial knowledge of German and French.—Address Colonel B. A. WILKINSON, late R.E., care of Messrs. Cox & Co., Craig's-court, London, S.W., or Heinrichs-strasse, 108, Darmstadt.

EDUCATION.—St. MARY'S HALL, 5 and 6, St.

Mary's-road, Canonbury, Islington, N.—English and French Institution for Ladies, on the principles of Queen's College (Established 1849) will RE-OPEN (D.V.) on the 18th of SEPTEMBER. Ladies wishing further instruction in any Branch of Education, under eminent Professors, can be received as BOARDERS for a Term or longer.

SARAH NORTHCROFT, Principal.

Prospectuses forwarded upon application.

WESTON-SUPER-MARE.—Mr. G. WHYTE,

M.A. (Edin.), receives a limited number of SONS of GENTLEMEN to prepare for the Public Schools, &c. Bracing Climate, thorough Training, and Home Comforts.

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Classics, Logic, the Moral Sciences, English Literature, and Philology, by a SENIOR CLASSIC, Author of Standard Educational Works. Examination Papers Answered. Composition Corrected.—LL.D., Northgate House, Highgate, N.

A GRADUATE (ætat 23), with some experience

in Tuition, and who has recently taken the highest Classical Honours at a leading Colonial University, seeks a position as LECTURER or ASSISTANT INSTRUCTOR in the higher branches of Classics in a Collegiate Institution. Very best testimonials, both as to qualifications and character.—Address THETA, care of Mr. White, Advertising Agent, 33, Fleet-street, London.

WOOLWICH—The LINE—COOPER'S-HILL.

—Mr. WILLIAM F. WALKER, M.A. C.E., Ex-Classical Scholar and Mathematical Senior Moderator (Univ. of Dublin), PREPARES PUPILS for the above-named COMPETITIONS. In July, 1877; passed 10th (Woolwich), 13th, 19th, and 20th (Cooper's-Hill); 5 for the Line (9th, 24th, &c.); Twenty-one successful for the Line during 1876-7, including 2nd (University), 6th, 10th, &c. (Open Competition). Highest Places obtained in the Woolwich, Line, and Cooper's-Hill Examinations during many consecutive years.—Address WILLIAM F. WALKER, M.A., 51, Lower Mount-street, Dublin.

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social position, speaking French and German, is ready to TRAVEL with a Family or Young Ladies. Salary no object; expenses to be paid.—S. P., Messrs. Kerby & Endean, General Advertising Agents, 190, Oxford-street.

REQUIRED, for a YOUNG LADY (experienced),

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ROBERT COWTAN, late a Senior Assistant in

the Library of the British Museum, and Author of 'Memories of the British Museum,' 'Autobiography of a Man of Kent,' 'Brief Biographical Sketch of Sir Antonio Panizzi, K.C.B. LL.D., &c., late Principal Librarian of the British Museum,' is desirous of devoting some of the leisure time now at his disposal in ARRANGING and CATALOGUING LIBRARIES, or engaging in any other Literary Work of which he is capable.—For terms, &c., apply to 24, Southampton-road, Maitland Park, London, N.W.

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Manager and Editor of a Provincial Weekly Paper. Has a practical knowledge of all Branches of Newspaper Work and Printing, and is able to undertake or superintend any of the duties in relation to the Editorial or Reporting Departments.—Address MANAGER, care of Messrs. Adams & Francis, Advertising Agents, 59, Fleet-street, E.C.

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A CORRESPONDENT is REQUIRED for an

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SATURDAY, AUGUST 25, 1877.

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LITERATURE

The Complete Poems of Sir Philip Sidney. Edited, with Memorial-Introduction and Notes, by the Rev. Alexander B. Grosart. 3 vols. (Chatto & Windus.)

Among editors of old poetry, the late Alexander Dyce stood not only foremost but alone. Gifford's critical knowledge was great, but his feelings overmastered him, and he scolded and vituperated in his Prefaces as though he were a barrister, and the poet were a client whose case was all but hopeless. Ritson had fine critical instincts, but made his books the means of expressing his personal antipathies. Leigh Hunt wrote prefatory matter often of the most delightful kind, and left the text to shift for itself. Of men like the Wartons or Theobald, who lived before the first rules of criticism, as applied to editorship, were understood, it is needless to speak. Since the death of Dyce, the task of editing our older poets has declined into such hands as those of the Rev. R. Hooper, Mr. W. Carew Hazlitt, and the Rev. Alexander B. Grosart. Of these, Mr. Grosart is the best. So poor are, however, his rivals, the compliment we pay him is of no special value. He takes pains with his texts; he does not, like Mr. Hazlitt, overload his book with notes explaining matters concerning which no one was ever in doubt, or sending the student to other books of his own for the explanation of a phrase which might be given in fewer words than are employed in the task of self-advertisement. His worst faults spring from excess of zeal. So enamoured is he of whatever poet he happens to deal with at the time, he vindicates his character from all aspersion, and extols his poetry beyond all reason.

In dealing with Sir Philip Sidney he has, for the first time, put a check upon his enthusiasm, and has written a "memorial-introduction," as he loves to call his prefatory matter, which does not wholly eclipse or overshadow the remaining contents of the book. His vindication of the purity of Sidney's love for Lady Penelope Devereux, subsequently Lady Penelope Rich, the Stella of the poems, is earnest and, perhaps, not unneeded; his explanations concerning the text are ample, and the only faults we have to find consist in some pardonable extravagance of eulogy and some slight affectation of style.

Justice has not hitherto been done to the merits of Sir Philip Sidney as a poet. His name appears in no collection of poets, and he is generally spoken of as the author of the 'Arcadia' and the 'Defence of Poetry.' Yet it is as a poet and as an experimenter in metre he claims especial attention. His efforts to adapt the English language to Latin measures were no more successful than those of succeeding writers. When, however, he confined himself to forms of verse simpler and more conformable to the genius of our language, he stepped in advance of all his fellows. It has been the fashion to insist upon the service rendered to poetry by Surrey and Wyatt. It is doubtful whether Sidney, who, of course, came later, did not do more than either of these poets, or any of his contemporaries, except Marlowe and Spenser, to give poetry the form it subsequently took. His sonnets are among the best in the language, and his lyrics have a metrical fervour such as those of no other poet of that day could rival. More than one of the favourite metres of Mr. Swinburne has been successfully employed by this writer, whom, during three centuries, men have hesitated to declare a poet. Here is a song, of which we quote the first two verses only, that is exactly in Mr. Swinburne's manner:—

Who hath his fancie pleasèd
With fruits of happie sight,
Let here his eyes be raisèd
On Nature's sweetest light;
A light which doth disseuer
And yet vnite the eyes;
A light which—dying neuer—
Is cause the looker dyes.

She neuer dies, but lasteth
In life of louer's hart;
He euer dies that wasteth
In loue his chiefest part.
Thus is her life still guarded
In neuer-dying faith;
Thus is her death rewarded
Since she liues in his death.

The close of the first and commencement of the second verse might easily be supposed to form portions of the 'Garden of Proserpine.' This is not the only form of metre Sidney uses with success. His employment of feminine rhymes is often very happy. This is witnessed in a poem, exquisite as a whole, known as the eighth song of Astrophel and Stella. Here are half-a-dozen verses, taken almost at random:—

Wept they had, alas the while,
But now teares themselues did smile,
While their eyes, by Loue directed,
Enterchangeably reflected.
* * * *

Stella, soueraigne of my ioy,
Faire triumpher of annoy;
Stella, starre of heauenly fier,
Stella, loadstar of desier.
* * * *

Stella, whose voice, when it speakes,
Senses all asunder breakes;
Stella, whose voice when it singeth,
Angels to acquaintance bringeth.
* * * *

This small wind, which so sweete is,
See how it the leaues doth kisse;
Each tree in his best attiring,
Sense of loue to loue inspiring.
* * * *

There his hands, in their speech faine,
Would haue made tongues language plaine;
But her hands, his hands repelling,
Gaue repulse, all grace excelling.

Then she spake; her speech was such
So not eares, but hart did tuch;
While such way she loue denièd,
As yet loue she signifièd.

The grave accents over the *e*'s in the last distich are inserted by the editor. If the reader chose to believe that the poet, for the sake of relief or variety, did not intend the letters to be sounded, he is, of course, at liberty to omit the accents. The poem abounds with conceits. These are, however, of a kind to which the lover has always been addicted. George Wither's defence of this form of extravagance in a love poem may stand as a lasting vindication.

Next to the lyrical quality to which full justice has never been done, the martial ring and chivalrous tone of Sidney's poems is what claims especial attention. His verses are, as he himself states, tempered to "trampling horses' feete." His sonnet upon obtaining the prize in a tourney, in which occurs that now famous phrase, "that sweet enemy France," is his best known poem, and has been included in many books of extracts. One or two other sonnets and poems are scarcely less popular. That commencing, "With how sad steps, O Moone, thou clim'st the skies," is known through Wordsworth's employment of the opening line, and "My true-loue hath my heart and I have his" has been inserted in one or two recent anthologies. The two sonnets which follow are less known, but scarcely inferior in merit:—

Because I breathe not loue to euery one,
Nor doe not vse set colours for to weare,
Nor nourish speciall locks of vowèd haire,
Nor giue each speech a full point of a grone,
The Courtly nymphes acquainted with the mone
Of them which in their lips Loue's standard beare;
What he! (say they of me): now I dare sweare
He cannot loue; no, no, let him alone.
And thinke so still, so Stella know my minde;
Profess in deede I do not Cupid's art;
But you faire maides at length this true shall find,
That his right badge is but worne in the hart;
Dumbe swans, not chattring pies, do louers proue;
They loue indeed who quake to say they loue.

Be your words made, good Sir, of Indian ware,
That you allow me them by so small rate?
Or do you curtted Spartanes imitate?
Or do you meane my tender eares to spare,
That to my questions you so totall are?
When I demaund of Phœnix-Stella's state,
You say, forsooth, you left her well of late:
O God, thinke you that satisfies my care?
I would know whether she did sit or walke;
How cloth'd; how waited on; sigh'd she or smilde;
Whereof,—with whom,—how often did she talke;
With what pastimes Times journey she beguilde;
If her lips daignd to sweeten my poore name.
Saie all; and all well sayd, still say the same.

Love's rapturous unrest has seldom been better depicted than in the latter of these sonnets. The last line of the former is also excellent. The sonnets almost as a rule end with some thought partaking more or less of the nature of a conceit. When Stella promises him her love so long as he remains virtuous and modest in his demands, he consoles himself—if the comparison of himself to a monarch does not imply delight rather than consolation—with the reflection,

No kings be crown'd but they some couenants make.

As a rule, the poems are carefully edited. At page 39 of the second volume, an exclamation "'udsfoot," which is obviously a comic interpolation probably of some singer, is allowed to stand, though it mars the metre of the poem in which it occurs. On page 84 of vol. i., in the sixth line, the word "wild" should obviously be "will'd." One or two similar mistakes occur in other portions of the volume.

We have not entered upon the question of the relations between Sidney and the lady he

addresses as Stella. Mr. Grosart has taken much pains to prove them altogether laudable, and has not been without success. Such speculations are not often remunerative. It is satisfactory to have at length a complete edition of Sidney's poems. His contemporaries, no bad judges in such matters, esteemed him a poet, and he only ceased to be considered one in the days when, all judgment of poetry having been lost, men educated in erroneous views began to collect what they called editions of the poets. If Sidney was excluded from these, his banishment was shared by Drayton, Daniel, Herrick, Wither, Suckling, the Beaumonts, Marlowe, Marvell, and indeed almost all who had the right to be considered poets. Somewhat tardily, this century is paying off the debts of the preceding.

The Psalms, with Introductions and Critical Notes. By A. C. Jennings, assisted in parts by W. H. Lowe. Books I. and II. Psalms i.-lxxii. (Macmillan & Co.)

This portion completes the work begun some time ago by the Messrs. Jennings and Lowe on the book of Psalms. The authors have shown greater ability and decision as they proceeded; and consequently the present volume is better than either of the preceding. It exhibits the same acquaintance with the literature of the subject; the same careful consideration of the difficulties so often occurring; a similar treatment of the Hebrew text, and the like sifting of opinions as to its meaning. Learning, talent, and research mark the pages of the commentary. It is not easy to advance the interpretation of the Psalms at the present time, for so much has been done by a few critical expositors, that we can hardly expect a commentary superior to what they have produced, unless it proceed from a ripe scholar, who has studied the Hebrew language long, and is capable of criticizing it with effect. The present work contributes nothing new or important. It bears traces of its authors' youth, which disappear more and more in the progress of investigation. Rashness and boldness are not wanting; and every now and then the editors contradict men infinitely superior to themselves in knowledge. Though the authors are learners, and might have postponed with advantage the publication of the commentary till their views had been matured by time and study, they pronounce a judgment on knotty questions with confidence. The book will be useful to students of the Bible, introducing them to an acquaintance with the best expositors, whose opinions are recorded very fairly. Special regard has been had to the views of Jewish commentators—more than they are entitled to from any intrinsic value. Yet, on the whole, the authors have made a judicious selection of the observations advanced by their predecessors, adding their own opinion, and objecting to what they believe to be incorrect. Their method of exegesis is good. They have condensed valuable matter into small compass. If we cannot say that they have contributed much that is valuable to our knowledge of the Psalms, they have at least composed a fair compendium, which will guide learners up to a certain stage, and prepare them for higher investigation.

The work contains Prolegomena, discussing Hebrew poetry, the formation of the Psalter, the divine titles and the relation of the Psalter to the New Testament. This is followed by a general Introduction, explaining the usual topics. In all this there is nothing striking, new, or specially excellent; while the chapters on the formation of the Psalter and its relation to the New Testament exhibit several erroneous statements. The former in particular is perfunctory.

The introduction to the fifty-first Psalm is excellent. As the commentator argues, the date of this ode is long post-Davidic. We cannot, however, adopt his conjecture, that the title is the work of the author of the Psalm, writing in the name of David. In like manner, the note upon lxviii. 18, is good and conclusive. Numerous specimens of sound exegesis scattered throughout the pages might be cited, showing that its authors have laboured zealously and successfully over their task.

But there are defects and inaccuracies. The writers speak of a primary and a secondary reference belonging to various Psalms; in other words, of *a double sense*. It is high time that this notion should be discarded, though by means of it some poems are made Messianic, such as the 2nd, 22nd, 72nd. So also in Psalm xvi. the prophetic "consciousness" of David is supposed to refer to Jesus. Here imagination is busy. The Messianic and Davidic Psalms of the expositors are multiplied; and the use made of the Old Testament in the New imperfectly apprehended. The difficult Psalms, lxviii. and xvi., do not seem to be well elucidated, as might be expected. The note on xxii. 16, "pierced my hands and my feet," is altogether unsatisfactory. The true sense of the disputed word is rejected, and another timidly adopted, "they bound." But it is unwarrantable to depart from the textual reading, "like a lion," and to have recourse to a verb. The supposed *typical* character of the Psalm has influenced the interpretation. The conjecture that Jeremiah describes his feet in the stocks as predictive of Jesus's feet on the cross is highly improbable. The second clause of the 30th verse in the same Psalm is incorrectly rendered, "He shall be accounted as Lord to that generation." Of course the singular reading of xvi. 10 (second clause), "thy pious one," is adopted; though there is little doubt that the plural is the original one, "thy holy ones." The *Kri* readings are usually adopted, though the *c'tîb* or textual are preferable. The note upon nēcim, in xxxv. 15, is another unsatisfactory one. The word is wrongly explained; and the various opinions stated should have been better sifted. It is surprising, too, that the doxology at the close of the 72nd Psalm (verses 18, 19) should be thought an integral portion of it. On Psalm xlv. 6, there are some just remarks at the beginning; but the commentator proceeds to give two translations as "equally admissible," without expressly deciding between them. The second, "Thy divinely constituted throne is for ever and ever," is the true interpretation. In Psalm xi. 7, the prenominal suffix of *pânêymô, His countenance*, is said to be the plur. majestatis; to which is subjoined "conf. Job xxii., xxvii. 23." This is a specimen of the slurring of a point which has exercised the ingenuity of the best grammarians, and has an important bearing on a verse in the 53rd chapter of Isaiah, The *plural of majesty*, into which it is resolved, is a fiction; and the philosophy of the apparently plural suffix, along with the discordant opinions of Gesenius and Roediger on the one hand, Ewald and Böttcher on the other, is ignored.

The Preface acknowledges obligations to Delitzsch, Hupfeld, and Hitzig; after which we are informed that Ewald will seldom be found of great service to any sober critic, and that he cannot claim a place in the foremost ranks of commentators. This judgment is notoriously wrong. With the exception of his commentary on the prophets, that on the Psalms is his best work; deserving even a higher place than Hitzig's. But we need not be astonished at the decision of those who disparage Ewald on the Psalms, when they regard Dr. Kay's useless book as worthy to be cited in their commentary.

If there be frequent cause to differ from Messrs. Jennings and Lowe, a respectable place among expositors of the Psalter must still be assigned them. On nice and delicate points of criticism they do not, indeed, satisfy expectation; their notions of typical and Messianic odes require correction; and their acquaintance with the older Christian commentators might have been extended; but they are generally fair in their exegesis, following, in the main, the best German commentators. Of English works on the Psalms theirs is probably the best, as it is undoubtedly the most useful for ordinary purposes. Though scholars who are familiar with Ewald, Hupfeld, and Hitzig can readily dispense with it, it occupies a good place among the inferior helps; leading up to those from whom its materials have been drawn as the guides of all that study the sacred book.

Az Olcsó Ebed. (The Cheap Dinner.) Translated from the German into Hungarian and English; with an Allegory and a few Fables by Fáy, translated from the Hungarian into English and German. By E. D. Butler, of the British Museum. (Haughton & Co.)

This tiny volume deserves special notice, in spite of its small size. There is a Hungarian proverb which declares that "Even a dog is not afraid of a little man," and a little book too often inspires critics with the reverse of respect. But there is a good reason for calling attention to Mr. Butler's modest contribution to English literature. Very little attention has been paid in England to Hungarian literature, notwithstanding Mr. Patterson's most laudable attempts to make English readers acquainted with it; and we can boast of but few linguists who are familiar with the sonorous but difficult tongue spoken by the Magyars. The late Mr. Watts, of the British Museum, was so well versed in it, that he was elected an Honorary Member of the Hungarian Academy, on account of his critical articles on the language and literature of Hungary, and he commenced the formation of a good collection of Hungarian books at the British Museum, a section of which he was specially proud, little thinking how sadly it would be neglected after his death. Of late, very few new books have been added to it, and it is even said that additions which had been purchased by him were allowed to remain for years uncatalogued, a point into which, if the statement be correct, it would be as well that the Trustees should inquire. There is more hope, however, for the Hungarian sec-

tion of the Library at present, for Mr. Butler, who is one of the officials of the British Museum, could not have produced the little book now before us without having acquired a sound knowledge of Hungarian, and with that acquisition there has no doubt been joined a healthy interest in Hungarian literature; and, where knowledge of a subject exists, neglect of it is seldom found.

Mr. Butler's translation of 'Das wohlfeile Mittagsessen' into Hungarian is a *tour de force* of which few foreigners, indeed, could have been capable. The allegory and fables by Fáy, which he has translated from Hungarian into German as well as English, are not very remarkable in themselves, but his renderings are excellent. In the allegory, a "wandering Mussulman" twice troubles Allah with unreasonable complaints about the weather. Twice his requests for a change are granted without comment, but the third time he is read a moral lesson which may be of value to grumblers among ourselves. Among the fables may be mentioned that of the Sloe-tree, the natural sourness of whose berries even age cannot abate; of the Ass, who, trudging in a dreary round, sneers at a free and fiery steed; and of the sturdy Bear, who is forced to dance, but dances reluctantly and under protest, unlike the servile Monkey, who capers with wanton pleasure through his degraded life. The proverbs are not very noteworthy. "God is the doctor in the last illness" appears to imply some idea that medical assistance is fatal. "You must sing his praises behind whose coach you ride" is a maxim which may be questioned by many footmen. It may be doubted, moreover, whether "Many geese will conquer a boar." There is some truth, however, in the statement that "Every one's friend is every one's fool," and that "The ox is still an ox, though you drive it to Vienna." "Do not rouse the Hungarian!" may be good advice generally, but it does not hold good in Mr. Butler's case, for we see that one of the Hungarian papers speaks in high terms of his efforts, and warmly encourages him to continue them. We trust that he will devote some of them to his own office, and try to make the Hungarian department what it would have been if Mr. Watts had not been prematurely cut off.

Historical Records of the Second Royal Surrey or Eleventh Regiment of Militia. Compiled by John Davis. (Ward & Co.)

THREE years have been devoted to what has evidently been a labour of love, and the result is a valuable and exhaustive history, not only of the 2nd Surrey, but incidentally of the English Militia generally. The Militia had fallen into a state of great inefficiency, and no little contempt, when in 1757 the act 30 Geo. II. was passed, and the history of the Militia in its present form may be said to have then commenced. There was considerable opposition to the new act in some parts of the country, and the requisite three-fifths of the Surrey contingent were not enrolled till the 20th of February, 1759, on which day an application was made for arms and accoutrements. On the 10th of March following the regiment counted 800 privates. The uniform of the corps consisted of—

"a long red coat, a long waistcoat, red breeches, and white gaiters,—in some regiments black gaiters were worn,—the skirts of the coat were lined with the colours of the facings of the regiments, which in the case of the Surrey was white, and the skirts of the coat being made to hook back, showed the colours of the facings of the regiment and the bottom of the long red waistcoat; the head-dress consisted of a hat; the hair was powdered and tied up in a queue behind. The arms were a musket, bayonet, and short sword."

On the 3rd of July, 1759, the regiment was embodied, and in the following November divided into two battalions of five companies each. It appears, from a return dated 19th of June, 1761, that in the first battalion three of the five companies were commanded by the colonel, the lieutenant-colonel, and the major. The quartermaster was also one of the five lieutenants, as was likewise the adjutant, and there were only two ensigns. In the second battalion there was no lieutenant-colonel, and the colonel had a company, but not the major. Of the five lieutenants one was the adjutant, and another the quartermaster. Of the four ensigns one was the surgeon. There was no surgeon in the first battalion. It will thus be seen that the regiment was very much under-officered. We may here remark that in the early days of the Militia the pay of a surgeon was so small, being only four shillings a day, that no one could be found to take it unless an ensign's commission was added. We find a mention of this arrangement so late even as 1801. The discipline in the Militia was, during the great war, as severe as in the line, and we all know how severe it was in the latter. The 2nd Surrey was stationed at Hull from July, 1805, till April, 1807, and during that time there were seventy-five courts-martial, principally on men who had been absent without leave.

The most notable event in the history of the Militia is the despatch of three provisional battalions of that force to the south of France, in March, 1814. The first battalion consisted of the Royal Bucks, a regiment which had volunteered entire. The second battalion was composed chiefly of the West Middlesex. The third battalion was made up of contingents of volunteers from various militia corps. The Marquis of Buckingham, commanding the Royal Bucks, was the Brigadier. All the officers had temporary military rank. "The first boats that attempted to land on the French coast with the militia troops, at a village opposite Blaye, were fired upon by the French soldiery." No casualties, however, were caused, and no other bullets were destined to whistle around their ears, for a few days after the arrival of the brigade the last battle of the war was fought. Landing in France at the end of March, the brigade re-embarked for England on the 6th of June. Had these militiamen served in the present day, the stray shots fired at Blaye would have earned them a medal. After the battle of Waterloo, the militia was neglected till 1852, when the system was, to a certain extent, reorganized. The establishment of the 2nd Surrey was increased from 668 to 990 of all ranks. This number was, however, never reached. In 1853 the deficiency only amounted to 14; but, in 1859, it had risen to 606, its maximum, and during 1874, 1875, 1876, the annual deficiency was respectively 499, 528, and 508. The number of enrolled men absent from training has also been great. In one year—1853—it was at its highest, namely 394; in four other yerrs, it was once 250; but, during 1874, 1875, 1876, it fell to 61, 54, and 55 respectively. As a set off, we may mention that since 1852 the regiment has given 1,248 men to the line. The largest number given in any one year was in 1855, when 207 men joined the regular army.

One of the most remarkable men connected with the regiment was its first adjutant, Francis Grose, the well-known writer on military antiquities, &c., and an intimate friend of Burns. In the Appendix an interesting account is given of that gentleman.

Sappho: a Tragedy, in Five Acts, by Franz Grillparzer. Translated by Ellen Frothingham. (Boston, U.S., Roberts Brothers.)

'SAPPHO' contains refined poetry of which the elements are not popular. It was the writer's first true work; his 'Ahnfrau,' produced in 1817, was one of the "fate-tragedies" of that time. Two years later he reduced to this dramatic form the old Greek legend of Sappho and Phaon, which, in obedience to usage, is here divided into five acts, but consists, really, of only three parts. In the first poetry prevails—a poetry that, as understood by Sappho, includes all that is ideal. Phaon, her supposed lover, is indeed conquered, not by the woman (too many years older than himself), but by the poetess, and she, loving him too well, is of course willing enough to believe herself beloved. But in Phaon poetry and refined sentiment are only skin deep, while his nature is capable enough of the passion commonly called love. Sappho believes that, in her union with him, a problem is solved that in this world will never be solved. Her faith gives to poetry an earthly body, and to reality an animating soul, and Lesbos is thus to be made a paradise. So ends the first part. The second introduces nature herself, and poetry, scared like a dove at the sight of a hawk, flies away. In other words, the great poetess disappears, and in her place there comes forward a jealous woman of middle age, who has too soon found out the truth that youth must love youth. Phaon has indeed fallen in love at last, but it is with a pretty young girl, called Melitta, a foster-child adopted by the poetess and very kindly treated. This girl must now be banished from the island, where her beauty has destroyed a paradise; but, if she goes, Phaon will of course go with her. He is not dreaming now, but can guess (within a year or two) the true age of Sappho. He despises; nay, he even insults the poetess, who in her fierce anger shows herself a woman. She at the same time pierces the glamour cast by her own genius and love upon Phaon, and in clear, cold daylight she sees him now—not the man who, for all that had happened, might love her the more, but Phaon, a handsome stripling—nothing worse, and nothing better. In his short time of dreaming, he fancied that he worshipped or loved Sappho; but now he would gladly leave her, to enjoy in Lesbos all the pleasures that genius may find in solitude. So ends the second part. In the third, the offended and angry woman disappears; the poetess—illumined, inspired, and consecrated—once more steps forward, and rightly she wears now her crimson mantle and is crowned with laurel; for is she not victorious? "The light

of the immortal gods is on her." That she should ever have cared for such love as Phaon's!—it is all a dream, and has for ever passed away. Of love her heart is indeed still full; but it is now "such love as spirits feel,

In worlds whose course is equable and pure."

Resigned, and contented with her own fate, she looks with kindness on her victorious young rival, and says calmly, when she gives to Phaon her last kiss—

"One kisses thee who is not of this world."

Here true art might see a good conclusion. But the stage has its own laws, and accordingly Sappho finally leaps from a high rock into the sea and is drowned. This act denotes despair, not resignation. What could that fatal leap do for her? Since she already enjoyed (as she said) true peace—the rest that is born when passion dies—why should it be sought in the depth of the sea? This conclusion might be made effective on the stage, but for all that it is a failure. Considerable care has been expended on the translation, and the poet's general tone of dignity is well echoed. But of all difficulties that of translating poetry into poetry is one of the hardest. For one who has tried that task, there can be no pleasure in pointing out defects in a conscientious attempt. But we may notice here one passage (p. 20) where seven lines come between the subject "name" and its verb. It should be remembered by translators, that English is for the most part a non-inflected tongue, and that, with respect to syntax, "order" is indeed our "first law."

Étude Philologique sur les Inscriptions Cunéiformes de l'Arménie. By L. de Robert. (Paris, Leroux.)

The cuneiform inscriptions found at Van, and in other parts of Armenia, are one of the philological problems that still await solution. The inscriptions can be read without difficulty, as they are written in a syllabary borrowed from Nineveh in the eighth century B.C., but a good deal simplified in the borrowing. Only a limited number of the characters used by the Assyrians was adopted by the Manni or Minni, the inhabitants of Van, and homophones and polyphones were rejected. A certain number of ideographs, however, was allowed, more especially the determinatives of deities, men, countries, and the like; and these ideographs enable us to make out the general meaning of most of the "Vannic" inscriptions, even though the language in which they are written remains a profound mystery. That is to say, while the idea represented by an ideograph is known, the pronunciation of it is not, except in the single case of the Air-god, the Assyrian Rimmon, whose name is once given as Tēsebas or Tēibas. Perhaps the most striking thing about the Vannic inscriptions is the preponderance of the vowels in them.

The Assyrian mode of writing was introduced into the country in the reign of a Vannic king, named Seduris, the son of Lutipri, and two inscriptions of his have been found written, not in Vannic, but in Assyrian. It was only under his son Isbuinis that the language ceased to be foreign, like the syllabary in which it was written. In default of bilingual inscriptions, the decipherer ought to make these Assyrian legends of Seduris the basis of his researches. Various attempts at decipherment have been made from time to time. Accurate copies of a considerable number of the inscriptions have been in the hands of scholars since 1840, when they were published in the *Journal Asiatique* from the note-books of the ill-fated Schulz. Dr. Hincks was the first to essay an explanation of them, his theory being that the language they embodied was an Indo-European one. M. Fr. Lenormant next suggested that light was rather to be looked for from the family of speech of which Georgian is a representative, and in the *Journal* of the German Oriental Society, in 1872, Dr. Mordtmann published an elaborate article, in which he endeavoured to interpret the inscriptions by the aid of modern Armenian. His attempt, however, did not satisfy other scholars; and M. de Robert now comes forward with the new hypothesis, that the language as well as the syllabary of the inscriptions is Semitic, and closely allied to Assyrian. He appeals in the first instance to the traditions which imply a close connexion between Assyria and Armenia before the arrival of the Aryan Armenians in the latter country, and he states his belief that the Aryans did not occupy the whole of Armenia before the sixth century B.C., although from very early times the northern part of the country was inhabited by "Japhetic Cushites" and the southern part by "Semitic Cushites." It is to the latter that the Vannic inscriptions belong, and the second half of M. de Robert's book is taken up with an endeavour to support his theory by explaining the language of the inscriptions by the help of the Semitic lexicon.

M. de Robert's ethnological views, however, are somewhat antiquated. Comparative philologists will be surprised to learn that the "Japhetic" races, having left the Kelts in the neighbourhood of Lake Urmiah, crossed the Caucasus under the name of Goths, from whom, it would seem, the Ossetes have descended, and that "the name of Hindu-Kush reveals to us the sojourn of the Cushites in that country." Such statements are a sufficient indication that their author has not qualified himself for the delicate task of determining the nature and affinities of an unknown tongue. And when we come to examine M. de Robert's translation and analysis of the Vannic texts, we find the indication fully borne out. Whether the Vannic language were Semitic or not, at all events M. de Robert has not proved it to be so.

In the first place, before attacking the Vannic inscriptions, the decipherer must be a thorough master of the Assyrian system of writing; and this M. de Robert certainly is not. He has postulated the existence of ideographs, not only where a comparison of texts is against it, but also where the usage of the Assyrian syllabary would not permit it; and the meaning he assigns to some of these hypothetical ideographs—*birki*, for instance, which really means "the knee"—is wholly erroneous. Worse still, he has misread a few of the characters. Thus, out of the character which represents the syllable *um*, he has extracted the numerals 3 and 4; he has divided the character for *ru* into two, which he transliterates *as'* and *s'ib*, although the second character never has that value, and at the very beginning of his decipherments he reads *ma* as *ba*.

In the second place, he has confounded the use of ideographs in the Assyrian texts with grammatical forms found only in Accadian texts; thus, he reads *aldubi* "algubbi," and translates it by "fortificavit," under the mistaken notion that *algubbi* is an Assyrian form. The word, however, is the third person singular of the Accadian present, and is naturally never to be met with in Assyrian inscriptions.

Thirdly, M. de Robert shows a deficient acquaintance with the Semitic languages to which he would assimilate the language of Van. In no Semitic tongue, for instance, could *as'ś'ibni* signify "statuit," and in order to get the root יצר out of *gissuri* he has to misread *iś'ś'uri*, and then assume a change of sibilant. Equally contrary to the spirit of the Semitic languages, too, would be an idiom almost destitute of prepositions and conjunctions, which uses *ni* as "a termination for denominative adjectives and gentilic nouns," while Assyrian is erroneously charged with changing the third person into the first when the subject remains the same. Indeed, anything more unlike Assyrian than the language M. de Robert has discovered in the Vannic texts can scarcely be conceived.

M. de Robert, however, modestly confesses his want of preparation for the task he has undertaken. It would have been as well if he had not undertaken it at all. His knowledge of Assyrian is but slight, and his authorities upon the subject are limited, and mostly not of recent date. The most serviceable part of his book is his comparison of two variant texts of the same inscription, one of which shows us that *aye* was the Vannic equivalent of "powerful." But the rest of it has been written in vain. If the language of the Vannic inscriptions is ever to be interpreted, we must have a better scholar and more practised decipherer than M. de Robert has proved himself to be.

Commentaries on the Liberty of the Subject, and the Laws of England relating to the Security of the Person. By James Paterson, Esq., M.A. 2 vols. (Macmillan & Co.)

The phrase, "the liberty of the subject," has, as Mr. Paterson in his Preface points out, a double meaning. It expresses first the rights with which the Crown cannot interfere of every subject as to his own person and property; and it expresses in the next place the rights of each subject as to his person and property as against his fellow subjects. The ground covered by the phrase "the liberty of the subject" is, therefore, a very extensive one. The following passage, which we quote from the Preface, shows the author's aim in the work, and contains some interesting observations upon the nature of the subject:—

"While an exhaustive account of the liberty of the subject in England thus really resolves itself into an exposition of the law, or at least a survey of all its leading landmarks, the difficulty of rendering that account satisfactory is at once apparent; and at the same time the reason is disclosed why so few intelligent citizens can go deeply into it, and why so vague an impression is often left on the inquirer by the explanations that are offered. It scarcely, however, accounts for the want of any systematic attempt having yet been made to treat this subject with the fulness and practical detail naturally to be expected, considering the ardent desire that must always exist to know more of it, not only in Great Britain, but in

Greater Britain and in foreign countries, where this crowning glory, the reputed end and aim of the English constitution, has acquired so just and enviable a renown. The author has here attempted to meet this want and achieve a difficult task. In his view the central idea involved in the English liberty of the subject becomes, on a complete analysis, the polar axis on which all the municipal laws revolve, and its various evolutions suggest a more true and rational division of those laws than has hitherto been current. And the adoption of a more natural distribution and arrangement of the materials is not only valuable in itself, but it will confer all the greater advantage if, as the author hopes and expects, the citizens of all other countries will be thereby provided with a ready means of comparison between their own laws and institutions and those with which England has long found good reason to be well pleased."

The work contains, besides two introductory chapters, in which legal definitions and terms and the divisions of law are discussed, chapters on protection of the body against threats and apprehended injuries; protection of the body against actual injury by the negligence of others; protection of the body against actual intended injuries, but not malicious; protection of the body against malicious, wilful, and negligent acts which kill or wound; protection of the body against want and destitution; temporary arrest and imprisonment other than on final judgment or sentence; punishment of the body by death or pains on final judgment and sentence; variations in foregoing rights and liabilities caused by age, by sex, by insanity and defective understanding, and by death; and a chapter on restrictions owing to compulsory acts and duties strictly personal.

Mr. Paterson's aim has been a high one, and he has, we think, successfully performed his task. The work is well and accurately written, and will be found of much use to lawyers as well as to laymen.

NOVELS OF THE WEEK.

World's End. By Richard Jefferies. 3 vols. (Tinsley Brothers.)

The Vandeleurs of Red Tor. By Theodore Russell Monro. (Samuel Tinsley.)

The book 'World's End' takes its title from a country house called by that name, and so far disappoints whatever expectations may be raised by its outside. But the reader who has the courage to plough through the wild horrors described with dismal minuteness in the course of the story will see that no expectation could have been framed which would not have been entirely inadequate. Mr. Jefferies's imagination appears to have brooded over certain recent events, and to have extended them or deepened their horror. Improving upon the various ingenious contrivances, of which we heard a good deal lately, for scuttling or blowing-up ships, Mr. Jefferies's villains invent a machine for diffusing a deadly gas throughout a ship, and in some inexplicable way keeping it undiluted, and endowing it with a marvellous power of attacking and killing even the persons who remain on deck. Mr. A. T. Stewart, the American millionaire, appears to have given another suggestion; and we have a vast army of claimants to a fortune, the annual income of which is, if we remember rightly, several millions sterling. The infernal gas-machine succeeds in disposing of a number of the claimants; others are destroyed by a sort of Guy Fawkes plot, the arch-villain of the piece collecting them in a theatre and suddenly loosening the foundations and letting the whole place down. Besides these two incidents, we have murders, escaped lunatics, sane people imprisoned in a private asylum and escaping by means of superhuman ingenuities; and, still more marvellous, but not less common, the wonderful accidents which bring rightful heirs to light. But there is nothing half so original in the book as Mr. Jefferies's panegyric upon Bohn's "cribs." It certainly says much for the classics that a person who only knows them at second hand (and such a second hand) should find them beyond measure admirable. Mr. Jefferies's literary judgment is original, but his originality appears to be only that which proceeds from ignorance or want of culture. His experience seems to be no less odd. He tells us of an old country squire, who takes up a young man and makes him come and stay several weeks or months alone in the house with himself and his only daughter. That might pass, of course; but the young man is a person who had made his living by snaring the old gentleman's hares at night, while his days, which ought to have been spent at his ordinary duties as a farm labourer, were passed in reading, sketching, and writing stories. Although the young man had only his labourer's clothes to wear, the squire and his daughter were above noticing such trivialities; and the squire was so infatuated as to buy a beautiful horse on purpose for the young man to go out riding alone with his daughter. All this, of course, is to end in a marriage; but while the ceremony is actually being performed, a messenger rushes into the church with the news that the old squire has been found dead, lying in a pool of blood. This gives Mr. Jefferies an opportunity of displaying another direction in which his ignorance is without limit, for he gives us an account of a coroner's inquest, the hearing of a charge before the magistrates, and a trial at the assizes. We begin to ask what class of occurrence could Mr. Jefferies describe correctly, or what sort of people does he know anything about? If he talks of a lady's-maid, he represents her as a raw country lass; if he talks of a lady, he seems to think there is no mistake in calling her Lady Lechester and Lady Agnes Lechester indifferently. We cannot deny that Mr. Jefferies has some taste for working out melodramatic horrors; but we see no reason to suppose that with any amount of labour he could ever write a book.

Mr. Monro describes his novel as "a tale of South Devon," and we will do him the justice to say that the book smacks of the scenery and surroundings amidst which its drama is supposed to be enacted. There is plenty of vigour in it, and a very respectable effort at character-drawing; but it is too crude to be ranked high as a work of fiction. It is full of handsome men and women; and they are all as worldly, not to say wicked, as the heart of a novel reader could desire. At the first start-off we are introduced to Lionel and Archibald Vandeleur, who are described as Hercules and Antinous; and almost every chapter brings forward a new rival of the glories of the gods and demi-gods of classical mythology. The descriptions are, in fact, marvellous for their colour. Of one lady we are told that "she seemed all eyes." In another place we have an account of the dresses of about a dozen ladies at a ball, which must have been supplied to Mr. Monro by one of his fair friends, or suggested to him by a page of a dressmakers' magazine. The story itself is not badly contrived, though it is too unpleasantly commonplace to have been worth the trouble of telling. The handsome men and women get on comfortably enough with each other until a certain Ethel Sevier comes amongst them. She engages herself to Antinous, runs away with his elder brother, Hercules, and then, meeting a former lover, arranges to elope with him. Unfortunately they are overheard by Ethel's husband, Sir Lionel Vandeleur, and a desperate single combat ensues between the two men, on the edge of a precipice.—

"With every muscle tense, a moment they rocked to and fro, then quivered erect once more. There was no blow, no blood, no sound. Each was slowly but surely strangling the other! Which would be strangled first? Their corded muscles stood out upon their limbs. Vandeleur's eyes were starting from his head, and Toler's face was bloodless as a corpse. There were but a few yards of soil between them and the edge of the rock! With one convulsive mighty effort each strove to shake himself free of the other's Herculean grip. The ground trembled, opened, slipped from beneath their feet, and hurled them crashing with it on to the jagged rocks below."

Ethel barely saves herself by clinging to a tamarisk, the roots of which were "firmly embedded in more consolidated ground." Her shrieks bring help from the neighbourhood, "but when her questioners sought from her some explanation of the scene, only the harsh laugh of a maniac made a grotesque reply." It is clear that the story, whatever its virtues or faults, is exciting enough; which is the most that we can say for it.

OUR LIBRARY TABLE.

Mr. Sharpe's *Book of Isaiah* (J. R. Smith) is as uncritical as his other publications which we have noticed lately. The following specimens will be sufficient to show his arbitrary arrangement of the prophecies. The eighteenth chapter, for instance, is applied to the Jews in Abyssinia, who, according to Mr. Sharpe's obscure notes, came there in order to escape from Babylonian cruelty. Besides that there is no trace of any Jewish colony in Abyssinia (the Falashas have nothing to do with an old colony), we cannot understand why the prophet should lay so much stress, in verse 7, on the Jews bringing presents to Jehovah. The nineteenth chapter, again, refers "to Egypt, when conquered by Antiochus Epiphanes and in the time of the Maccabees." The pure language of that prophecy should have led Mr. Sharpe to another opinion. The altar to Jehovah, in verse 19, according to Mr. Sharpe's interpretation, alludes to the temple built by Onias IV. in 149 B.C. (rather 160), whilst Josephus says (B. J., VII. x. 3), Ἐγεγόνει δέ τις καὶ παλαιὰ πρόρρησις ἐτεσί που πρόσθεν ἐξακοσίας. Ἡσαΐας ὄνομα τῷ προαγορεύσαντι τοῦδε τοῦ ναοῦ τήν Αἰγύπτῳ γενησομένην ὑπ' ἀνδρὸς Ἰουδαίου κατασκευήν. The so-much-disputed fifty-third chapter prophesies, according to Mr. Sharpe, of Zerubbabel. No Jewish commentator, as far as we are aware, has ventured to suggest such an explanation. From what we know of Zerubbabel, he was prosperous in his enterprises, and none of the sufferings mentioned in this chapter befel him, unless Mr. Sharpe has discovered some new documents referring to that time. Most amusing is his note on the passage, "For he grew before him as a weak plant," when he says, "From this passage we learn something of Zerubbabel's character"; certainly from this note

we may learn something of Mr. Sharpe's fanciful interpretations. The word עשיר, *rich* (v. 9), is taken by him for אשור, *Assyrian*, and במותיו is translated, *Among his dead men*, and explained by the following note, "Ezek. xxxii. 22, Assyria and her company are described as lying in hell, or the grave." Assyrians at the time of Zerubbabel!

In a certificate which appears on the first page of *The Officer's Memorandum Book for Peace and War*, which Col. Harrison has compiled, and Messrs. H. S. King & Co. publish, Sir Garnet Wolseley says that he "can confidently recommend Col. Harrison's Memorandum Book to the officers of the army as an excellent *aide-mémoire* upon military subjects." With such an *imprimatur* the work before us is sure to succeed, and we are glad to find that the author is sufficiently grateful to praise in the Preface Sir Garnet's 'Soldier's Pocket-Book'; but in truth Col. Harrison needs no warranty of excellence, for a glance at this handy little memorandum-book discloses its merits. He describes it correctly when he calls it "a refresher to the memory in time of need." On almost every subject connected with the art of war there is a brief clear note, giving, in most cases, that which it is so difficult to retain in the memory, figures. The notes are, as a rule, very accurate; but we notice one or two defects. Nothing is said of wire or string entanglements. No mention is made of the two depôt companies which form part of a regiment of French infantry. In stating the ages of enlistment in the English army, it is asserted that for long service a man may enlist between eighteen and twenty-five, and short service men between eighteen and thirty. By a Government Order of February last, twenty-five is the maximum age for either long or short service. The minimum height standard of infantry, too, is 5 ft. 4½ in., not 5 ft. 5 in., as stated. Notwithstanding these slight blemishes, this is a most useful officer's companion.

We have received from the Librairie Germer-Baillière, of Paris, the first two volumes of an issue of the complete works of Edgar Quinet. These volumes contain his letters to his mother, which are singularly wanting in literary or political importance and in human interest.

Bacon's *Illustrated Guide to London and Suburbs* is without a spark of originality as regards arrangement, and void of all thought for the requirements of "strangers and sightseers," whose stay in London is necessarily limited. The two maps are the best thing about the Guide; that of London, however, is not furnished with a scale.

We have received from Messrs. Bradbury & Agnew the first six volumes of the "Handy volume Waverley" edition of Sir Walter Scott's novels It is an excellent pocket edition; even better than the corresponding Shakspeare.

We have on our table *The Golden Path to French*, Part I., by A. F. Genlain (Hachette),—*Proceedings of the Royal Colonial Institute*, Vol. VIII., 1876-77 (Institute),—*Second Annual Conference on the Health and Sewage of Towns* (Society of Arts),—*Journal of the Royal United Service Institution* (Mitchell),—*A Treatise on Navigation and Nautical Astronomy*, by O. Byrne (Bentley),—*United States Commission of Fish and Fisheries: Report of the Commissioner for* 1873-4 *and* 1874-5 (Washington, Government Printing Office),—*The Student's Handbook to the University of Cambridge*, by A. P. Humphry, M.A. (Bell),—*The Victoria Cross in the Crimea*, by Major Knollys (Dean),—*Eight Years a Bluecoat Boy* (Dean),—*The Bluecoat Boys*, by W. H. Blanch (Allen),—*The Modern Arabian Nights*, Part II., by A. à Beckett and L. Sambourne (Bradbury),—*The Poet's Magazine*, Vol. II. (Moxon),—*The Death of Saul*, by J. C. Manning (Swansea, Manning),—*Iter Persicum*, by E. K. de Zalonkemeny, translated by C. Schefer (Paris, Leroux),—*Die Auster und die Austernwirthschaft*, by Karl Moebius (Berlin, Hempel & Parey),—and *Encyclopedie der Christelijke Theologie*, by Dr. J. I. Doedes (Utrecht, Kemink). Among new editions we have *A Handy Book on the Law of Master and Servant*, by J. W. Smith, LL.D. (Wilson),—*Remarks on the Advantages of Glengarriff as a Winter Health Resort* (Bush),—*Subtle Brains and Lissom Fingers*, by A. Wynter, M.D., revised by A. Steinmetz (Hardwicke & Bogue),—*Ocean to Ocean*, by Rev. G. M. Grant (Low),—and *Le Vieux-Neuf*, by E. Fournier, 3 vols. (Paris, Dentu).

LIST OF NEW BOOKS.

Theology.

Fleming's (Rev. J.) Helps to Burdened Souls, 12mo. 1/6 cl.
Keim's (Dr. T.) History of Jesus of Nazara, Vol. 3, 8vo. 10/6 cl.

Music.

Anthems Sung in the Cathedral Church of Ely, edited by W. E. Dicken, cr. 8vo. 2/ cl. lp.

Geography.

Marsh's (H. C.) A Ride Through Islam, 8vo. 14/ cl.
Muihall's (Mr. M. G.) From Europe to Paraguay and Matto-Grasso, 8vo. 5/ cl.

Science.

Fanning's (J. T.) Practical Treatise on Water Supply Engineering, 8vo. 30/ cl.
Jevons's (W. S.) Principles of Science, cheap edit. 12/6 cl.
Kincaid's (Rev. S. B.) Conic Sections, cr. 8vo. 2/6 cl.
Lucas's (Dr. T. P.) Laws of Life and Alcohol, cr. 8vo. 2/ cl.
Moissenet's (Prof. L.) Observations on the Rich Parts of the Lodes of Cornwall, 8vo. 7/6 cl.
Morgan's (W.) Contagious Diseases, cr. 8vo. 3/6 cl.

General Literature.

Armourer's Daughter, 12mo. 2/ bds. (Railway Library.)
Campbell's (Lord G.) Log Letters from the Challenger, new edit. cr. 8vo. 6/ cl.
Cullingworth's (C. J.) Catalogue of the Radford Library, 3/6 cl.
Edwards's (M. B.) Never Again, 12mo. 2/ bds.
Lever's (C.) Luttrell of Arran, cr. 8vo. 3/6 cl.
Lytton's (Lord) Ernest Maltravers, Library Edition, 7/6 cl.
Manley's (J. J.) Notes on Fish and Fishing, cr. 8vo. 10/6 cl.
Month (The), Vol. 11, 8vo. 9/6 cl.
Timbs's (J.) Romance of London, Supernatural Stories, Historic Sketches, 12mo. 1/6 each, swd.

'SERVETUS AND CALVIN.'

Lymington, Hants, August 20.

In your critique, in No. 2597, of the above work by Dr. Willis, you give a quotation from the author to show that Servetus discovered the circulation of the blood long before Harvey; but it appears to me that Rabelais has a still stronger claim to the merit of the discovery.

Two or three dates will be necessary to establish the probability of that which I wish to advance.

I have to quote from your article, in which you state that Servetus "was a little less than twenty years old in 1530."

Rabelais was born in 1483, so that he was forty-seven years old when Servetus was only twenty.

'Pantagruel' was published in 1533, when Servetus was twenty-three, and Rabelais fifty years old. In Livre 3, chap. xiv. of that work is the following passage:—

"Puys" (le sang) "est transporté en une autre officine, pour mieulx estre affiné, c'est le cueur, lequel, par ses mouuemens diastolicques et systolicques, le subtilie et enflambe tellement que, par le ventricule dextre, le met a perfection, et par les venes l'envoye à tous les membres. Chascun membre l'attire a soy et s'en alimente a sa guise: piedz, mains, yeulx, tous: et lors sont faictz debteurs qui parauunt estoyent presteurs. Par le ventricule gausche, il le fait tant subtil qu'on le dict spirituel, et l'enuoye a tous les membres par les artères pour l'aultre sang des venes eschauffer et esuenter."

That Servetus knew Rabelais perfectly well, can hardly be doubted. A hatred of Calvin, common to both, must, I think, have naturally brought them together; and it seems to me highly probable that Rabelais, one of the most eminent physicians of his day, was the discoverer of the circulation of the blood, and that Servetus may, in his writings, have repeated a then well-known fact without thinking it necessary to attribute the discovery to Rabelais. R. H. Weldon.

DISSERTATIONS FOR THE DOCTORATE.

The literature of dissertations for obtaining the Doctor's degree is unfortunately increasing yearly to such an extent that it is scarcely possible for any specialist to read all of them. The English and also, we are glad to say, some of the German universities are satisfied with a dissertation presented in manuscript; we cannot be thankful enough for this wise proceeding. In France the dissertations have to be at first submitted to the learned body for approval; and often the subject which the candidate proposes for discussion is rejected on moral, religious, or political grounds. Whilst the German faculties are content with one dissertation in Latin or German, the French authorities require two—the one in Latin and the other in French. The German productions are mere pamphlets, and we may say that perhaps one in twenty is worth reading. The French dissertations, on the other hand, are books methodically composed, and nine out of ten remain an acquisition to literature and science. Thus, for instance, M. Renan's two dissertations, viz., the Latin one on the peripatetic philosophy amongst the Syrians and the French one on Averroes, are works which have to be taken into consideration by those who write on the same subjects. This year is exceptionally favoured by dissertations of the highest importance. M. J. Darmesteter, one of the youngest but already of the most distinguished of Zend scholars—he has undertaken the translation of the Zend-Avesta for the collection of the translation of sacred books under the direction of Prof. Max Müller—has published a dissertation, treating the history of Ormuz and Ahriman in a new light. It forms a volume of the publications of the "École des hautes Études." M. l'Abbé Duchesne, of the French school of Rome and Athens, who has lately contributed so much to Greek epigraphy, wrote a most elaborate dissertation on the 'Liber Pontificalis.' M. Bergaigne, of the "École des hautes Études," announces his Doctor-thesis, entitled 'Les Dieux Souverains dans la Religion Védique,' which is only an extract from the author's two volumes on the same subject. M. Bergaigne is a rising Sanskrit scholar, and his book will certainly be a great contribution to Vedic mythology. We have before us M. Arsène Darmesteter's two dissertations, viz., the Latin one, 'De Floovante vetustiore Gallico poëmate et de Merovingo Cyclo.' The poem was originally composed, according to the author, in the twelfth century in French, and was imitated in Holland, Scandinavia, and Italy. The present text is of the fourteenth century, in a semi-Lorrain dialect. The French dissertation, 'De la Création actuelle de Mots nouveaux dans la Langue française et des Lois qui la régissent,' is a very original work, and most important for modern French philology. Although restricted by the Dictionnaire de l'Académie, the French journalists and novelists cannot help infringing in some respects upon the central authority of the French language. M. Darmesteter gives not only a dictionary of neologisms of the last hundred years, but the history of their gradual development according to grammatical, lexicographical, and psychological laws. The following table, which does not contain the minute subdivisions, will give an idea of the author's methodical and scientific mode of proceeding. After having spoken in the Introduction of neologism in general, we find three parts: 1, "Formation Française," comprising the headings, *a*, Dérivation impropre; *b*, Dérivation propre; *c*, Composition. 2, "Formation Latine et Grecque." 3, "Emprunts aux Langues modernes," which is followed by the conclusion and the alphabetical index. It may be interesting for English readers to know what the author says about English words adopted by the French. "De nos jours, presque tous les emprunts de notre langue sont faits à l'Anglais; c'est l'Angleterre qui nous envoie ses inventions, ses produits, ses modes, ses gouts, sa *fashion*. Aux luttes implacables du premier Empire ont succédé des rélations amicales, chaque jour plus étroites. Londres et Paris se donnent la main à travers la Manche; échange de bons termes, et échange de termes où la France, croyons nous, reçoit beaucoup plus qu'elle ne donne. Il est vrai que dans les siècles antérieurs, sans remonter jusqu'à la conquête Normande, le Français avait fourni une quantité considérable de mots à l'Anglais. Quelques mots français même, ayant jadis passé le détroit, nous reviennent aujourd'hui sous une forme qui les rend presque

méconnaissables. *Tunnel, budget, bill, reporter, square, mess*, &c., sont autant de mots originaire-ment Français—*tonnel, bougette* (petite bourse), *bulle, rapporteur, carré, mets*, &c. Mais, en changeant de forme, ils changent aussi de signification; ils s'approprient à des fonctions nouvelles, et comme ce sont celle-ci qu'il s'agit précisément de dénommer, rien de plus juste que de prendre avec la chose le nom sous la forme Anglaise; *square, bill, tunnel*, &c., disent autre chose que *carré, bulle, tonneau*, &c." This is followed by an alphabetical list of the English words adopted in French. The author has carried down his list of neologisms to *L'Assommoir* of M. Zola. We miss the list of authors quoted in M. Darmesteter's books, which, we hope, will be supplied in a second edition, when the author will probably also be able to add some other neologisms. It is certain that it is impossible to be complete in every respect in a first edition of a lexicographical treatise.

"FIAT JUSTITIA."

I think *Fiat Justitia* has an older authority than that mentioned in your last number. An undated letter, published in the 'Egerton Papers' (Camden Society, 1840), and assigned by Mr. Payne Collier to the year 1552 or 1553, contains it:—"The zeale of hym was allowed that said *fiat justicia ruat mundus*." W. J. Loftie.

SHAKSPEARE'S TOMB.

August 18th, 1877.

There are many people who find pleasure in visiting the burial-place of a great man, and Englishmen may be proud of boasting that there is a continual stream of visitors day after day, in all weathers, to the church at Stratford-upon-Avon; and our pride may be not a little enhanced by the knowledge that a large proportion of the visitors are foreigners. There was also a satisfaction in the fact of free admission to the church. One did not begrudge a small coin to the patient and civil doorkeeper, who is always there to open the gate. A few days ago I visited the church with a friend, and was pointing out with pride, as I walked up the lime-shaded church path, the number of visitors notwithstanding the stormy weather, when I was accosted by my old acquaintance the doorkeeper with "Sixpence each for admission, if you please." I learnt that this charge has been made for a fortnight, and is to be continued; but I could not learn how the fund thus obtained was to be expended.

Englishmen will hardly grumble at having to pay sixpence to see the burial-place of the great poet, but we must feel sorry that foreigners, who honour our poet by making a pilgrimage to his tomb, have such a charge made on them.

Frances Collins.

THE VOCAL MEMNON.

In the review of the 'Geschichte Aegyptens' of Brugsch in the *Athenæum* of August 4th, the following words occur:—"The idea of Wilkinson that the sound" (of the vocal Memnon) "was produced by the trickery of the priests is untenable." Some of your readers may wish to draw their own conclusion from the words of Sir Gardner himself:—"In the lap of the statue is a stone, which, on being struck, emits a metallic sound that might still be made use of to deceive a visitor who was predisposed to believe its powers; and, from its position, and the squared space cut in the block behind, as if to admit a person who might thus be concealed from the utmost scrutiny of an observer in the plain below, it seems to have been used after the restoration of the statue. Another similar recess also exists beneath the present site of this stone, which may have been intended for the same purpose when the statue was in its mutilated state. Having remarked the peculiar sound of this stone, and subsequently finding in one of the inscriptions that a certain Ballilla had compared it to the 'striking of brass,' I posted some peasants below, and ascended myself to the lap of the statue, with the view of hearing from them the impression made by the sound. Having struck the sonorous block with a small hammer, I inquired what they heard, and their answer, '*En'te betidrob e' nahas*'—'You are striking brass,' convinced me that the sound was the same which deceived the Romans, and led Strabo to observe that it appeared to him as the effect of a slight *blow*. That it was a deception there can be little doubt; the fact of the Emperor Hadrian hearing it *thrice* looks very suspicious; and a natural phenomenon could not have been so complimentary to the emperor when it sounded only once for ordinary mortals:—χαιρων και τριτον αχον ιη—'Rejoicing (at the presence of the Emperor) it uttered the sound a third time.' Some, however, think the priests incapable of such a deception; why, I know not. . . . I suppose, also, that stones are only sonorous on being struck." The *hour* at which this sound was allowed to be heard gave rise, no doubt, to the pretty fable that the mother of King Amunoph was Aurora, but the idea is not Egyptian. It is to be feared that the practical way in which Sir Gardner Wilkinson carried out this inquiry suggested to the quick-witted *fellahin* a means of misleading future students.

Caroline C. Wilkinson.

*** We still adhere to our opinion.

PALESTINE EXPLORATION.

A discovery which may turn out of considerable importance has just been reported from Jerusalem. Excavations have been recently conducted in the neighbourhood of the Kalat al Jalud (Goliath's Castle) at the north-west corner of the city wall, by the Latins, for the foundation of a new college. Major Wilson's plan (Ordnance Survey Notes) showed the existence of two square masses of old masonry; two other similar structures are now exposed; and it is found that these four piers are connected by an arch, stated by Dr. Chaplin to be of very ancient appearance. He suggests that they may have formed the foundations of the tower Psephinus. Herr Schick has made a plan of the locality in its present state, which has been sent to the Committee of the Palestine Exploration Fund. South of the piers there has been found the angle of a "very old wall of rough megalithic masonry." Can this be, Dr. Chaplin suggests, a relic of the hastily constructed wall of Nehemiah? It is hoped to get careful photographs taken of the masonry before the stones are touched by any modern "improvers." As shown in Schick's plan, the stones have the well-known "marginal draft."

Another expedition in search of Moabite pottery is reported to have gone, to have sought, and to have found. It consisted of the German Consul, Herr Schick, and two other Germans. Details of what they found will doubtless arrive before long.

Literary Gossip.

The novel, 'A Year's Letters,' "by Mrs. Horace Manners," to appear in the current number of the *Tatler*, is, we are informed, Mr. Swinburne's first attempt at novel writing.

The publication of the 'Life of Thomas Carlyle,' the first chapter of which appeared in No. 1 of the *Biographical Magazine*, will, at the request of Mr. Carlyle himself, be discontinued. The author, Mr. Frederick Martin, of the 'Statesman's Year Book,' has Mr. Carlyle's consent to prepare his biography, and any of our readers who may be in possession of any interesting particulars of Mr. Carlyle's career may communicate with Mr. Martin, at his house, 7, Fortess Terrace, Kentish Town, N.W. We understand, also, that in the mean time the publication of the *Biographical Magazine* will be suspended.

An opportunity appears to offer itself at the present moment to set on foot an important effort for the acquisition of further Assyrian historical and philological knowledge, provided that liberal pecuniary assistance be forthcoming. We understand that Mr. W. St. Chad Boscawen, late Assistant in the Department of Oriental Antiquities in the British Museum, where he gave himself up to the study of the cuneiform languages of Asia, which, we rejoice to know, he is unwilling to abandon, is desirous of starting upon an expedition to the, archæologically speaking, fertile plains of Mesopotamia, and, by a systematic investigation of the ancient sites of buried cities, of opening a new chapter in ancient Eastern history. Mr. Boscawen will start under the patronage of some of the first Assyriologists of the time, and we feel sure that his endeavours will be amply rewarded, as indeed they deserve to be, by the acquisition of a large number of important facts bearing directly upon the chronology and language of the ancient world.

Prof. Th. Ouspensky, of the University of Odessa, who has lately published a book on the first Sclavonic monarchies, and a monograph on the Byzantine writer, Nicetus Acominatus, has been working for some weeks in the Bodleian Library on MSS. concerning the Byzantine history of the twelfth century. The author is also about to bring out a monograph on the relation of the Bulgars with the Byzantine empire. Of course Prof. Ouspensky writes in Russian, and his books will be unfortunately, for a certain time, inaccessible to the public at large.

Prof. Pauli, of Göttingen, has arrived in England for the purpose of collecting documents to be found in English chronicles from the tenth to the thirteenth century concerning the history of Germany. He will chiefly pay attention to the libraries of Lord Ashburnham, Sir Thomas Philipps, and other private libraries, whilst Dr. Liebermann has been working for the same objects in the library of the British Museum, and at Oxford and Cambridge, on collations of Matthew Paris, John of Salisbury, and Henry of Huntingdon. These documents will be published as a continuation of Pertz's 'Monumenta Germaniæ.'

During the past summer session of the University of Leipzig, the number of matriculated students was 2,842,—341 of them being theologians, 920 jurists, 366 medical, 433 philologues, 193 naturalists, 158 philosophers, 150 mathematicians, 86 pedagogues, 83 pharmaceutists, 78 agriculturists, 34 financiers. 96 had permission to attend lectures; so that the entire number amounted to 2,938. About 100 English-speaking students were among this large number.

The task of writing history threatens to become almost impossible in France, if the French Bench encourages prosecutions by illustrious nobodies against authors who happen to treat as they deserve statesmen and warriors long ago buried in oblivion. One of the most curious of such actions is that recently brought by a young poetaster of the name of Villiers de l'Isle Adam against the authors of the popular drama of 'Périnet Leclerc.' It is certain that Marshal Villiers de l'Isle Adam joined the English in 1421 against the hosts of Charles the Sixth, his liege sovereign. The descendant of the French marshal contends that it is a libel against his ancestor to say

that he delivered the town of Beaumont into the hands of the English, and he claims a fine and substantial damages from the authors so bold as to circulate such a calumny against his ancestor. *Adhuc sub judice lis est.* The barrister of the defenders suggests in his pleadings that M. Auguste Villiers de l'Isle Adam has no other purpose in this suit than to obtain a judicial sentence legitimating his pretended descent from the marshal and from the illustrious Great Master of the Rhodes Knights. M. Jules Claretie gives, in the *Indépendance Belge*, another motive for this singular lawsuit—that of calling attention to the forgotten attempts at poetry committed some time ago by M. A. Villiers de l'Isle Adam, under the titles of 'Isis' and 'Premières Poésies.'

Under the name of the Società Romana di Storia Patria, an historical society is about to be founded in Rome for the publication of unprinted documents relating to the laws and history of the city and neighbourhood.

The 1876 additions to the National Library at Paris included 52,000 printed works, 408 maps, and 140 manuscript works. The latter included a collection of 297 letters written by Napoleon III. to Hortense Cornu, between the 25th of August, 1820, and 19th of September, 1872. This imperial correspondence is presented by its recipient under the proviso that no portion of it be published previous to 1885, when it is to be entrusted to Prof. Renan, if he be then living.

M. Rouveyre, of Paris, has just published a most interesting catalogue of works of all kinds prosecuted, suppressed, or condemned, from the 21st of October, 1841, to the 31st of July, 1877. M. Fernand Drujon is the compiler.

Herr Weber, of Leipzig, will shortly issue the prospectus of a new universal literary lexicon, somewhat similar to the 'Dictionnaire' of M. Vapereau. It is to be hoped that foreign writers will receive more careful treatment from the German editors than they have had from M. Vapereau.

Mr. Thomas S. Cayzer, head master of Queen Elizabeth's Hospital, Bristol, has made a complete collection of the principal passages in Latin authors that refer to our island; and, editing them with Vocabulary and Notes, is about to issue the volume through Messrs. Griffith & Farran, as a Latin reading-book illustrated with many woodcuts and a map, under the title of 'Britannia.'

Mr. Evelyn Jerrold is engaged on a Life of Honoré de Balzac, which will be finished by the end of the year.

Two excellent translations from the French have just been published by Messrs. Chapman & Hall, one of them being of Count de Falloux's 'Life of Augustin Cochin,' and the other of M. Charles de Mazade's 'Life of Cavour,' which we reviewed at the time of the publication of the original.

Mr. Tegg asks us to state that the stock and copyright of "The Classical Texts," forming at one time a portion of the stock of Mr. Parker, of the Strand, was not included in the sale to Messrs. Longmans & Co., but was purchased by him.

The French Academy has decreed the "Bordin" prize of 3,000 francs to M. A. Chantelauze, for his work entitled 'Marie Stuart, son Procès et son Exécution.' This account of the last days of the Scottish Queen is founded upon a journal lately discovered in the little town of Cluny, of a Dr. Bourgoing, the Queen's physician, which records with minuteness all the circumstances of her trial and execution. The Academy has also decreed a moiety of the prize of 5,000 francs, founded by M. Marcelin Guérin, to M. Capmas, for a work published by him on Madame de Sévigné, in which he has brought to light twenty-one hitherto unknown letters of that charming letter-writer. The other moiety of the Guérin prize has been allotted to M. Eugène Pelletan, for his two historical and philosophical romances, 'Royau, la Naissance d'une Ville,' and 'Jarousseau, le Pasteur du Dessert.'

The "Service des Travaux Historiques" of the City of Paris has up to the present time published seventeen volumes, and promises three additional volumes before the end of the year, viz., 'Les Jetons de l'Echevinage Parisien,' a posthumous work of M. D'Affry, of the Mint; 'Le Livre des Métiers,' by Étienne Boileau; and 'Le Cabinet des Manuscrits,' by M. Léopold Delisle. Four other works of interest are mentioned as being in progress; namely, the 'Topographie Historique du Vieux Paris'; the 'Épitaphier Général de Paris; the 'Cartulaire Général de Paris jusqu'à l'Année 1870'; and 'Le Plan dit de Tapisserie en 1530.' With such energy does the Paris Municipality apply itself to the publication of its ancient records; apprehensive, perhaps, that such of them as still remain may perish in future fires.

The Rev. Canon Jackson, in continuance of his researches among the historic documents belonging to the Marquis of Bath, has had privately printed at Devizes an interesting paper read by him before the Wiltshire Archæological Society on the subject of 'Amye Robsart,' to which he has subjoined an 'Appendix of Original Documents Discovered at Longleat.' The learned canon complains that readers in general have taken for granted the account given by Sir Walter Scott in his romance of 'Kenilworth' of the murder of Amye Robsart, with the connivance of her husband, the Earl of Leicester. Sir Walter's account, however, as he himself states, was taken from Ashmole's 'Antiquities of Berkshire,' which Mr. Jackson calls "one of the most meagre of publications." "This book," he says, "was not published by himself, and consists of very little more than notes of epitaphs in Berkshire churches which he had visited, and which notes were found among his papers, and were printed after his death. Among them was found the story of Amye's death: but it had been merely *copied* from another authority. That other authority was a much older one, called 'Leicester's Commonwealth.' This was one of the most virulent compilations that was ever put together, and was written, it was said, by Father Parsons the Jesuit. It was circulated only in MS. for many years, but upon being printed in 1584, four years before Dudley's death, was publicly proclaimed by the Privy Council to be an infamous and scandalous libel. Such (to trace things to their source) is the authority on which 'Kenilworth' is founded." Mr. Jackson, in his paper, gives a full account of Dudley and his marriage with Amye Robsart, and of the terms upon which they lived together, as also of the circumstances of her unhappy death, and concludes by acquitting her husband of any share in it. We cannot say, however, that to our mind he has succeeded in dispelling the strong suspicion of guilt that rested on Dudley.

The new edition of Whitaker's 'History of Craven,' which, under the editorship of Mr. A. W. Morant, F.S.A., has been in progress for a year and a half, is expected to be in the hands of the subscribers in November. Amongst the new matter will be included an account of the Geology, Natural History, and Prehistoric Antiquities of the district, written by Mr. L. C. Miall, F.G.S., Curator to the Leeds Philosophical and Literary Society. Mr. J. Dodgson, of Leeds, is the publisher of the work.

Only thirty-eight papers are published in Finland, and only one of these is a daily; it is printed half in Swedish and half in Finnish. The most important printing establishment in the country belongs to the Finnish Literary Society, which employs three machines and two hand-presses, and maintains sixty *employés*.

According to the official catalogue, 296 newspapers and journals are registered at the Swedish post-office: of these, 95 are published in Stockholm, 19 in Gothenburg, 13 in Upsala, and 9 in Malmö. Eleven daily papers appear in Sweden, 6 of them belonging to the capital; 2 are published four times, 20 thrice, 51 twice, and 76 once, a week. The others appear at uncertain intervals. On comparison with last year's catalogue, an increase of 27 for 1877 is discovered.

Before Christmas next there will be published by Oscar L. Lamm, of Stockholm, an album, called 'Literärt Album,' containing contributions in prose and verse by the best Swedish authors, with portraits of each author.

An account of the recent circumnavigation of the globe by the Austrian corvette, Archduke Friedrich, has been prepared by Lieut. Lehnert, and is now publishing. It is profusely illustrated with engravings.

The Strasbourg Library has just received a donation of books from Madras. The gift consists chiefly of Hindoo works, the most valuable being a theological one in Tamil, describing in four thousand songs or hymns the holy places consecrated to Vishnu.

The chief German booksellers have subscribed to present to the National Museum at Nürnberg a perfect copy of the 'Biblia Pauperum' and the 'Historia beatæ Mariæ Virginis.' The two works were purchased in Leipzig for 16,500 marks, and are fine specimens of block printing.

It is reported from Madrid that Señor Ruiz Zorrilla proposes to publish a history of the important events which happened during the revolutionary period in Spain, and in detail those which preceded and followed the abdication of the Duke of Aosta. Those implicated in political movements at that time fear injudicious and compromising details, as Señor Zorrilla has the habit of "plain speaking" very strongly developed.

SCIENCE

BOTANICAL BOOKS.

Dictionnaire de Botanique. Par M. Baillon. Dessins de A. Faguet. Premier Fascicule. (Hachette.)

If this work be carried out in the same style in which it has been begun, it will not only be a comprehensive cyclopædia of botanical lore, but it will be a *véritable ouvrage de luxe*. As the part before us extends no further than the letters AI, it is too soon to say much of the intrinsic merits of the book, but the paper, printing, and, above all, the woodcuts, are excellent. The woodcuts have a finish about them which is rarely attained in English periodicals of similar nature. Some of these illustrations we recognize as old friends, but nevertheless their sharpness of outline and soft gradation of shading are as remarkable as before, and lead us to infer that the present illustrations have been printed from "electros" taken from the original blocks, previous to their having passed through the press. Turning to the text, one would have thought that M. Baillon had already enough in hand with his valuable 'Histoire des Plantes,' and that his time would more profitably have been taken up with that publication, the completion of which cannot in any case be looked for in any brief period. Probably in the course of collecting materials for that work M. Baillon has also accumulated information for the present Dictionary. Moreover, he has in this case associated with himself many of the leading and most active among the younger botanists of France, so that we may fairly anticipate an adequate representation of French botanical science. One of the first things that strikes us, in looking through the first instalment, is the number of "native names" introduced, and these at once raise the oft-debated question as to the value to be placed on such appellations. For our own part, speaking from a botanical point of view, we are not disposed to attach any great importance to them. When we find in our own language half-a-dozen or more widely different plants called in the popular vernacular "laurels," not one of them being the rightful owner of the name, we may fairly question whether the "Heathen Chinee" is likely to be a whit more precise in his nomenclature than the Anglo-Saxon or Modern Celt. If the laurel case were exceptional, it would of course not have much weight as an argument, but every botanist knows that, so far from being exceptional, it is quite the reverse. Again, the spelling of native names presents a great difficulty. It is obvious that the same word would be spelt very differently when heard not only by English ears as contrasted with French or German, but even very differently by natives of different provinces of the same country. These circumstances render the introduction of native names into such a cyclopædia an undertaking of doubtful value, unless, indeed, they are revised by some one who is at once a competent philologist and an expert botanist. One at least of M. Baillon's *collaborateurs* is known to possess this fortunate combination of gifts, so far as some languages go; but who shall deal with them all? Another feature of the present publication is the introduction, in the briefest terms it is true, of the names and achievements of the botanists of various countries. Even Abbot, the author of a Bedfordshire Flora in the last century—a work of purely local interest—finds a place. If this dictionary is intended, as it appears to be, for popular use, then the room occupied by such entries as the one we have just mentioned, would have been better filled by other matter. Professed botanists would be sure to look to such works as Pritzel's Thesaurus, where they would find a fuller and more complete account than it is possible or desirable to give in a dictionary like M. Baillon's. The descriptions of the various genera are written in a popular style, with the advantage of the addition of numerous bibliographical references which greatly enhance the value of the publication. Explanations of technical terms necessarily find a place, while physiological subjects, such as "Absorption" and "Accroissement," are treated at some length, the articles bearing those titles furnishing a very good summary of our knowledge on these subjects as derived from the writings not only of French, but of German and other naturalists. For the ordinary English reader the handy little 'Treasury of Botany' will be more useful than the present more diffuse publication, but for the French reader the case is different. Moreover, the English-speaking, working botanist will, if the promise of the present publication be fulfilled, find the present work so serviceable that no botanical library of any importance can afford to be without it.

Tropical Agriculture: a Treatise on the Culture, Preparation, Commerce, and Consumption of the Principal Products of the Vegetable Kingdom. By P. L. Simmonds. (Spon.)

This volume has an imposing look, as far as bulk is concerned, and its title, though simple, is comprehensive. To some extent it is misleading, in so far, that is, as regards the implied promise of a treatise on the husbandry of the tropics. Cultural details are, indeed, given here and there, but there is no general sketch of the conditions under which the cultivation of plants for commercial purposes is carried on, no comprehensive account of the method of culture, the system of tillage, the price and conditions of labour, the fiscal regulations and taxation which must enter so largely into the farmer's computations. What we have got is a mass of information compiled from consuls' reports and other official sources, and relating to a few of the principal plants cultivated for food and economic purposes generally. In fact, it is a cyclopædia of information relating to certain "commercial products of the vegetable kingdom," and is an expansion of a similar volume published under that title by the same author a quarter of a century ago. Mr. Simmonds is an industrious and generally accurate compiler, while his personal experience in some departments gives additional value to his judgment in matters where he has had to trust to others for his information. The present treatise will not take rank side by side with the similar works of Pereira, Royle, or Hanbury, whose scientific training and mode of thought gave them an advantage, not only in the selection, but also in the rejection of evidence, and ensured a more critical and thorough treatment of the material at their disposal than we find in the present volume. We say this without any wish to detract from the praise really due to the compiler, whose work is likely to supply a long felt want so efficiently, that to say that he has not the same grasp of his subject as some others who have written on cognate matters, does not depreciate from the absolute value of his own labours. Mr. Simmonds has taken care to bring his information up to time present; thus we find the new Liberian coffee receives the mention its merits deserve, while the leaf-disease of the coffee-plant also comes in for a share of notice. There are, however, some rather important omissions. Thus, we find no mention of cotton, tobacco, india-rubber, or gutta-percha, while cinchona culture is dismissed with two incidental references. There is probably some good reason for this—indeed, the author states in his Preface that he has omitted the mention of fibrous plants by reason of the "numerous special handbooks" which exist, relating to them. If Mr. Simmonds had not cared to increase the bulk of his volume by including notices of the products we have mentioned, he should, at least, have cited the titles of some of the numerous special handbooks he mentions, concerning which, as we know by experience, the general public frequently make inquiries not always easily answered. A good table of contents and a full index complete the volume, which, although it does not fully justify its title, will form an indispensable reference book for those who are interested in the commercial products derived from plants.

Horticulture. By F. W. Burbidge. (Stanford.)

This little volume forms one of a series of books devoted to various British manufacturing industries. It is most appropriate that horticulture should be included in such a series, as few except professed horticulturists recognize how fully the rose they admire, the vegetables they consume, or the fruits they enjoy are products of industrial skill. Nature furnishes the raw material, and she imposes the conditions of success; but there is left, nevertheless, a very large field for the observation and experiment of the practical gardener. Here, again, kindly nature, rightly read, shows the thoughtful gardener what to observe, in what direction to look for success, and the most likely means to ensure it. All, or almost all, the products of our gardens, especially those for which the demand is necessarily great, and the supply correspondingly extensive, are distinctly the products of art, and the outcome of human industry and skill. Wealth and enterprise may secure a costly orchid, or a stately palm for the decoration of our stoves, just as the same agencies will procure for us diamonds or costly furs. But for the feeding of the multitude, or the decoration of the homes and gardens of the people, wealth and enterprise are not the only factors, but technical skill also comes specially into play, as it does in most cases where an article has to be produced in quantities and at a low price. The present volume may serve to give the reader some general idea of the amount of capital and labour expended in commercial horticulture, an amount, we believe, far in excess of what is generally supposed. We are not aware of any trustworthy statistics on the point, and regret that our author did not develope this portion of his subject in fuller detail. The chapter on "Fruit Culture" will be read with special interest in this season, when, if our markets are not supplied from America or elsewhere, apples and pears will be almost nonexistent. Fruit culture in this country has spread, and is spreading rapidly; nevertheless, there are thousands of acres which might be more profitably devoted to this branch of agriculture than to any other. In any case, however, the demand for fruit is likely to become so great, that we shall not be able to depend upon home supplies save to a very limited extent. Thanks to steam navigation, other countries pour of their abundance into our laps, and our stalls are filled with Newtown pippins from across the Atlantic, oranges from the Azores, pears from France and Jersey, while even pine-apples are now introduced from the Azores, so low in price, and so excellent in quality, that our gardeners are giving up the cultivation of what used to be considered pre-eminently an English luxury—a home-grown pine. Other chapters of Mr. Burbidge's book are devoted to vegetable growing, plant propagation, Covent Garden produce, and various incidental matters. The whole forms a readable little volume, which will probably attract public attention from the novelty of the subject. In some respects the book is a mere sketch, accurate so far as it goes, but capable of being developed to a much larger extent. Few persons are so well qualified to do this as Mr. Burbidge.

The Elements of Machine Design. By W. C. Unwin. (Longmans & Co.)

Mr. Unwin, who is Professor of Hydraulic and Mechanical Engineering at the Royal Indian Engineering College, has placed at the head of this little book an extract from the 'Theoretische Kinematik,' of Prof. Reuleaux, which we reviewed some time since. Nothing, however, can well be more opposed than are the methods in which the two volumes have been written; and it may at once be said that 'The Elements of Machine Design' will be both more acceptable and more useful to the great majority of English students than the more ambitious theorizing of the German writer. Mr. Unwin's object has been to explain the principles which are available as guides in

machine construction. His book contains a selection of practical rules and useful proportions for various parts of machines. The mathematics employed are for the most part of a very simple kind. The diagrams are clear and workmanlike; and the little volume will be found a valuable handbook for the engineering draughtsman.

Africa and the Brussels Geographical Conference. By Émile Banning. Translated by R. H. Major. (Sampson Low & Co.)

M. Banning's book has been written for the purpose of enlightening the public with respect to the scheme of exploring and civilizing Africa which has been put forward by the King of the Belgians. In the first part the author traces the progress of exploration during the nineteenth century, glances at the most striking physical features of the Continent, says a few words about the various races that inhabit it, and supplies some information respecting the slave trade. This introduction may interest readers not versed in matters geographical, but it certainly does not fairly represent our present knowledge of Africa. Mr. R. H. Major, the translator, whose share of the work has been done very creditably, could not fail to perceive this, and in a "Memorandum" prefixed to the book he guards himself against being held responsible for any "expression or omission therein." The second part deals with the organization of the International Association. So called National Committees have now been formed in most countries of Europe, but we are not aware that any steps have been taken hitherto, beyond the collection of money, for realizing the object which united a distinguished body of geographers and philanthropists under the hospitable roof of the Royal Palace at Brussels. There can be no doubt that a few permanent stations in the heart of Africa, adequately supplied with instruments and observers, might render great services to science, and eventually to commerce; and if the Association will set about at once to establish them, it will have gained a good title to public support.

Railways of New South Wales: Report on their Construction and Working, from 1872 *to* 1875 *inclusive.* By John Rae, H.M. Commissioner of Railways. Presented to Parliament by Command. (Sydney, Richards.)

The Report of Mr. Rae, the Commissioner for Railways in New South Wales, to the Secretary of Public Works is a document which might, with great advantage, be taken as a model by the authorities of the mother country. It is by far the best account of the condition, general outcome, and details of economical action that we have seen drawn up with regard to any railways in the world. The great difference between Mr. Rae's work and the Board of Trade Reports is, that in the former there is an honest effort to give every information that can be required, while the latter has to struggle with the efforts of the companies to withhold every fact which they are not absolutely compelled to publish. There is, of course, a great advantage, from a literary point of view, in the small length of the lines described, as it allows a thoroughness of treatment which might become excessively voluminous if applied to thirty times the length of line. But this remark does not apply to the tables, some of which are as novel in their conception as they are exhaustive in their teaching. In twenty years the sum of 7,245,379*l.* has been invested in 437 miles of line now open. An additional length of 251½ miles is in progress. The gross revenue has risen year by year (with the sole exception of a slight check in 1859), from 9,093*l.* earned on 14 miles in 1855 to 614,648*l.* earned on 437 miles in 1875. The net earnings have risen from 3,290*l.* in the former, to 318,474*l.* in the last-named, year; and the interest on capital employed from ·638 to 4·396 per cent. Since 1861 the ratio of working expenses has diminished from 81·58 to 48·18 per cent. This compares very favourably with English lines, although the rate of wages in the colony is more than double that with us; a smith, for example, receiving 1*s.* 1*d.* instead of 6½*d.* per hour. And this prosperity is likely to increase, since the mineral traffic earns under 12 per cent. of the gross revenue, and, unlike the mineral traffic of England, is conducted on a publicly stated and adequate tariff. One addition only is required to make this Report a complete handbook for the analyst of railway finance: the mileage and weights of the different vehicles are not given. In this respect the Indian, French, and American returns are more instructive than is this one of Mr. Rae. Following our own slovenly habit, the "train mileage" is given, without any indication of how many vehicles go to the train. If this information be hereafter added to the tables of mileage, Mr. Rae will give to the world not only a model account of his own lines, but a mass of systematically arranged information which will be of great value to the managers and the proprietors of the railways of the world.

BRITISH ASSOCIATION.

MATHEMATICAL AND PHYSICAL SCIENCE.
(Section A.)

Prof. Foster's opening address was well pitched—neither too technical nor too popular, but, from beginning to end, offering points of interest to all classes of auditors.

His recommendation of the systematic reporting of progress in each branch of physics by committees appointed for the purpose is well worthy of careful consideration, and, though doubtless liable to great practical difficulties, might, under the direction of really able editors, contribute largely to the advancement of science.

His illustrations of the mutual relations between mathematics and physics were well chosen; but we were still more struck by the aptness of his remarks on the mutual benefits conferred by science and the industrial arts:—

"Probably it would be impossible to find a more remarkable instance of what I referred to just now, as the second way in which practice may react upon science so as to promote its advancement, than is presented to us in the case of electric telegraphy. This is an example of an industrial undertaking which is the direct offspring of scientific research, and could not have co-existed in its actual state of development with a less advanced condition of electrical science; but, if it were possible to establish any common measure for such things, it may be doubted whether it would not be found that telegraphy has repaid to science benefits equal to those it has received. For instance, the discovery of earth-currents was a direct result of the large scale of the instrumental arrangements which are needed for telegraphic purposes, and is one which would probably have long remained unmade in the absence of some inducement to make experiments on a scale greater than that indicated by the visible wants of scientific inquiry. The same may be said of the discovery of the influence of electrostatic induction upon the transmission of electric currents through metallic conductors, and of the consequent additions to our knowledge of the specific inductive capacity of insulators and of the whole subject of electrostatic capacity. But by far the most important of the benefits conferred by electric telegraphy upon electrical science have resulted from the necessity under which the practical electrician found himself, of not only being able to produce certain results, but of producing them under definitely ascertained conditions as to the expenditure of time and material. When it was perceived that slight variations in the electrical conductivity, insulating power, or specific inductive capacity of certain materials might affect the pecuniary return upon investments reckoned in millions of pounds sterling, measuring instruments were devised which far surpassed in delicacy and accuracy those that had been previously made for purely scientific purposes, or the cost of which exceeded the means usually at the disposal of scientific investigators. The multiplication and wide diffusion of such instruments has led to the rapid accumulation of numerical data of great scientific importance, and has largely contributed to the spread of accurate conceptions as to the quantitative laws of electrical phenomena. But the further necessity experienced by practical electricians, that, besides being able to make accurate measurements, they should be able mutually to communicate and to understand each other's results, has probably done more than anything else to hasten the introduction, for scientific purposes, of so-called 'absolute' measurements, instead of mere comparisons of each quantity to be estimated with a standard magnitude of its own kind. The use of absolute measures constitutes one of the most characteristic differences between the physics of to-day and that of the time when the British Association was instituted, and it may even be said to lie at the base of the doctrine of the Conservation of Energy, which implies the principle that every kind of Energy can be reduced to the same denomination."

The following remarks on the misapplication of mathematics to physics are also very much to the purpose:—

"Perhaps, after speaking, as I have done, of the necessity for the co-operation of mathematics in the advancement of physics, it is not inappropriate that I should, in conclusion, refer to the possibility that, by a too implicit reliance upon mathematical guidance, the physicist may be led away from the discovery of fresh truth or even into actual error. Mathematics is seen to be so indispensable and usually so powerful an aid in physical investigation, that there is a danger of forgetting that there are, after all, limits to its power. Partly from want of sufficient knowledge of the physical data on which mathematical discussion must be based, and partly from the imperfection of mathematical methods themselves, it happens that it is not possible to give a thoroughly complete mathematical account of even the simplest physical phenomenon. In all real cases, although some one effect may often predominate so greatly as alone to attract attention in a cursory view, the actual complexity is so great, that it is only by deliberately leaving out of consideration what we believe to be the accidental accompaniments of a phenomenon, and confining our attention to what seems to be its essential and characteristic part, that it is possible to make it the subject of mathematical calculation. The consequence is that the problems treated of in mathematical physics are not the problems presented by nature, but are problems suggested by these, and derived from them by a process of ideal simplification. There is, therefore, always a possibility that, in the simplifying process, some apparently trivial, but really important, feature of the actual phenomenon, to which the ideal one is meant to correspond, may have been overlooked. When this is the case, the fact will reveal itself sooner or later by the occurrence of discrepancies between the results of mathematical theory and those of experimental investigation. Such discrepancies are the finger-posts pointing to new discoveries; but the experimenter who forgets the inevitable limitation to the authority of theoretical conclusions, arising from the conditions I have alluded to, is apt to disregard them, and perhaps conscious of laziness and want of care in his method of experimenting, or sometimes from a want of proper self-confidence, he attributes all anomalous results to 'the unavoidable errors of observation.' Two classes of experimenters are safe from falling into this danger. There are, first, those who, the first time they observe anything that is not provided for in their text-books, conclude that the Law of Gravitation ought to be reconsidered; secondly, there are those who, with scrupulous care, take account of all the conditions which are known to be able to affect the phenomenon they are investigating, and are thus able to say, with well-founded confidence, when they meet with some unforeseen result, that it must indicate the operation of some unrecognized cause."

Lord Rayleigh, in seconding the vote of thanks for the Address, justly remarked, "Mathematicians often observe that experimental labour is misdirected, and results are puzzled out with much

labour which mathematicians could have told beforehand; and on the other hand physical questions are often overlaid with a great quantity of inappropriate mathematics. There is great necessity for the co-operation of mathematicians and physicists."

The first paper read was by Prof. Haughton, of Dublin, and led to an interesting discussion. The paper related to the displacement of the earth's axis of rotation, which must have been produced by the elevation of the present continents from the positions which they formerly occupied at the bottom of the sea. Confining his calculations, for simplicity, to the best known case—that of the continent composed of Asia and Europe—he found that its elevation would move the poles of the earth through sixty-nine miles, and the new poles would not be fixed, but would revolve in a period of one hundred and five days round the original poles, thus producing a "wobbling" motion. This "wobbling" would gradually be destroyed by the friction of the ocean against the solid earth, and the circles described by the new poles round the extremities of the earth's axis of figure would thus continually become smaller, at a rate which we were not in a position to calculate with any degree of accuracy, but of which we had, nevertheless, the means of forming a rough estimate. Astronomical instruments were sufficiently delicate to detect a displacement of the pole even so small as ten feet, if such existed; and from its non-existence the problem was suggested, How long would it take to reduce a wobbling of sixty-nine miles radius to a wobbling of five feet radius? He had roughly solved this problem and thus furnished a contribution to the measurement of geological time.

Sir W. Thomson, while expressing a high opinion of the value of the paper, and his belief in the soundness of the method there employed for calculating the time necessary to extinguish a "wobble," demurred to one very important point in Prof. Haughton's argument. A wobble of the magnitude asserted by Prof. Haughton would, no doubt, follow from the *sudden* elevation of the continent; but an elevation of the same magnitude, if taking place gradually, would produce scarcely any wobbling at all. To illustrate this point, suppose a heavy pendulum hung from the ceiling and originally at rest. If this pendulum were suddenly drawn aside by a pull applied at the far end of a long india-rubber cord, and the far end of the cord were then maintained steadily in the position to which it had been drawn, the pendulum would be set in oscillation; it would oscillate about its new position of equilibrium. But if, on the other hand, the far end of the cord, instead of being pulled suddenly, were drawn so slowly as to occupy half an hour in travelling to its new position, the pendulum at the end of that time would not be oscillating, but would be at rest in its new position of equilibrium. In like manner, changes in the distribution of the solid parts of the earth, taking place gradually, could never produce any considerable deviation of the instantaneous axis of rotation from the principal axis. Sir William went on to remark that a small wobble with a period of three hundred and five days had been suspected by Peters, and the investigation had recently been continued by Neison. The general result was that there was no wobble greater than would be due to temporary upheaval and depression of different parts of the surface of the sea by wind.

Mr. Evans, in the course of some remarks on the paper, said he was grateful to astronomers who would allow even so small a change as sixty-nine miles in the position of the poles of the earth, and he hoped they would see their way to concede a much larger displacement.

Sir W. Thomson, in reply, said changes in the earth's axis cannot have taken place without changes in the solid matter. Take, for instance, such a case as the supposed glaciers of India. There is evidence from scratched stones which seems to prove glacial action, and it has been supposed that this may be explained by shifting of the earth's axis. On the other hand, it has been suggested that the region in question may have been higher than at present, and some fifteen thousand feet of additional elevation would on this hypothesis be sufficient; while at least thirty-five thousand feet of elevation, not of a single district merely, but of a fourth part of the earth's surface, would be required to produce the shifting of the pole required by the rival hypothesis. Astronomers were ready to allow any amount of change of the earth's axis if geologists would only find the requisite displacement of solid material.

Prof. Haughton then gave a most interesting paper on the "Eclipse of Agathocles," in its bearing on the question of the acceleration of the moon's mean motion. Many of our readers are probably not aware that, in comparing the moon's motion now with what it has been in past times, great use is made of the few records of total solar eclipses which are handed down by ancient historians; and modern astronomers are not satisfied until they can make their lunar tables so perfect as to enable them to identify each eclipse so recorded, and give a much more complete description of it than the record itself.

Prof. Newcomb, of Washington, in the spring of the present year published a paper calling in question certain results supposed to be established by Adams and Delaunay regarding the lunar acceleration; and, in support of his argument, he proceeds to "pick to pieces our eclipses, one by one"; among others the eclipse above named, respecting which he says we do not know on which side of Sicily Agathocles sailed. Prof. Haughton, after giving a most graphic account of the remarkable enterprise which Agathocles was carrying out when the eclipse occurred, pointed out various reasons which seemed to leave no doubt of the correctness of the view usually maintained.

Prof. Adams, being called upon, said his impression was that Prof. Haughton was right. He could not help thinking that there was a real retardation in the motion of the earth, and that this was proved by a real discrepancy between the calculated and observed values of the acceleration of the moon's mean motion.

On the following day, Prof. Adams contributed two papers of much interest on astronomical subjects.

The first of these described the discovery of a new inequality in the moon's motion. Its existence was first detected by Prof. Newcomb in the course of a very exact discussion of lunar observations preparatory to reducing the observations of the transit of Venus; and its cause was discovered by a young Englishman, named Neison, who had deduced the period, phase, and magnitude of the inequality from purely theoretical considerations. The cause was found in the influence of Jupiter, and the mathematical investigation is precisely the same as that which applies to the well-known inequality called "evection," which is produced by the sun's action precisely in the same way as this new inequality is produced by the action of Jupiter.

Prof. Adams then proceeded with another paper, in which he vindicated Sir Isaac Newton from the imputation of a mistake regarding the motion of the apse of the moon's orbit. It is generally believed that Newton was baffled in his attempt to investigate this subject. He does not give the investigation in his *Principia*. He does, however, give the investigation of the motion of the node, and obtains a result in accordance with observation. It is often stated that he investigated the motion of the apse, and obtained a result which is only half the real amount. We will give Prof. Adams's remarks on this subject in the first person for greater clearness:—

"I felt sure that he had not made so great a mistake on that subject as is generally supposed. There is a scholium in the first edition of the *Principia* which was omitted in subsequent editions, and I knew from that scholium that he had looked on the subject from a right point of view. It was replaced, in later editions, by a longer scholium going into minute details regarding the lunar inequalities, and the original scholium has been overlooked. My conviction has been confirmed by a perusal of manuscripts of Newton's in the possession of Lord Portsmouth's family, who are descended from Newton. Lord Portsmouth has recently presented to the University of Cambridge the scientific portion of these papers, and they have been submitted to me. Though they are, for the most part, of a very rough character — looking like waste papers that he scribbled upon, and put away—there are some that bear directly upon this point, and there is one particularly—a short paper, nearly in a state for publication—which investigates on mathematical principles, in geometrical fashion, the motion of the apse line of the moon under given disturbing forces, whether radial or tangential. This, as a mathematical proposition, is beautifully worked out, and is accurate, and is the proposition which would be wanted for the actual application to the case of the moon. I found, with regard to the actual application to the moon, no papers in a similarly mature condition. There were some which showed he had been working at it, and showed he was on the right track; but the result which he gets out, though much nearer the truth than the rough result that is thought to be his, is still only of a rough character, and, from the number of corrections in Newton's hand upon it, one can see that it is only a rough draft. Whether he worked it out more perfectly on papers which we have not got I cannot pretend to say; but these papers prove that Newton was perfectly acquainted with the right principles on which the motion of the lunar apse may be determined. Newton attacks the problem in this way: he supposes the inequalities which are independent of the eccentricity to be already determined; then he considers what the motion of the apse would be if the eccentricity were very small. I have long been convinced that that is the proper way to attack the problem, and I have attacked it myself in the same way very long ago. That is the way in which Mr. Hill, the author of the paper which I am about to describe, has attacked the subject." Prof. Adams then proceeded with a very technical description of this paper of Mr. Hill's.

In answer to a question put by Prof. Haughton, Prof. Adams explained that Newton's words, "the apse of the moon goes about twice as fast as this," which do not appear in the first edition, are intended to mean that we must not apply what immediately precedes to the case of the moon, though it is suggested by taking into account one particular part of the disturbing force; for in the case of the moon the other part of the disturbing force produces about as great an effect, so that the whole disturbance is twice as great. That is the view Newton really had in this passage, which has been completely misunderstood.

CHEMISTRY.

(SECTION B.)

Prof. Abel, this year's President of the Section, began his Address, like almost all his predecessors had done for the last twenty years, with an allusion to the colours derived from coal-tar. To do this seems *de rigueur*. From this subject, which happily was only briefly touched upon, the President turned to the great iron and steel industry, treating this important branch of chemical practice at considerable length. He took occasion to show that "the brilliant results achieved from time to time by investigators in organic chemistry, the rapidity with which, by those results, theories are established or extended, types founded, their offspring multiplied, and their connexion with other families traced and developed, impart to organic research a charm peculiarly its own. This, and the general ease with which new results are obtained by the pursuit of methods of research comparatively simple in their nature and few in kind, have for many years not only secured to organic chemistry an overwhelming majority of workers; they also appear to have had a tendency to lead

the younger labourers in the field of organic research to under-estimate the value and importance, in reference to the advancement of science, of the labours of the plodding investigator of analysis. Yet no higher example can be furnished of the patient pursuit of scientific work, purely for its own sake, than that of the deviser or improver of analytical processes, who, undeterred by failure upon failure, indefatigably pursues his laborious work, probing to its foundation each possible source of error, carefully comparing the results he obtains with those furnished by other methods of analysis, and patiently accumulating experimental data till they suffice fully to establish the value and trustworthiness of the process which he then publishes for the benefit of his fellow-workers in science. Truly the results of such labours do not stand in unfavourable contrast, from whatever light they may be viewed, to those of the investigator of organic chemistry." Yes, he is right there. It is nowadays so easy to be a smart "organic" chemist, not much more being required for this distinction than to take some coal or wood-tar, to treat it with nitric acid, to determine the boiling-point of the mess obtained, and then to come down to Burlington House and manufacture structural formulæ by writing C, H, O, and N in all possible positions and groupings on the blackboard.

Prof. Abel rightly maintains that the elaboration of a new and good method of analysis may rank in value with a good research in organic chemistry. "An excellent illustration of this is afforded by reference to the Proceedings of the British Association when it met in this town thirty-six years ago. In a letter to Dr. Playfair, Liebig, who took a very active part in the proceedings of the Association in the earlier years of its existence, reports that Doctors Will and Varrentrapp have devised an excellent method for determining the amount of nitrogen in organic bodies, 'very exact and easily performed.' He then describes in a few lines the process so well known to chemists, which not only has been, and continues to be, invaluable to those engaged in organic research, but which, as may be testified by such researches as those of Lawes and Gilbert, has borne a most important and indispensable part in the advancement of agricultural chemistry. It is, I believe, but an expression of the unanimous conviction of chemists to say that the achievements in analytical chemistry of such men as Berzelius, Heinrich Rose, and Fresenius take equal rank with the brilliant researches and theoretical expositions of such chemists as Liebig, Laurent, Gerhardt, and Berthelot, and that of all the important contributions to the development of organic chemistry which we owe to Liebig, there is none which has exerted so great an influence on the progress of this branch of chemical science as his beautifully simple methed of organic elementary analysis."

Reverting to iron and steel, the Address duly mentions those who were the first to try to throw light on the composition of iron ores. "Among the earliest to realize the importance of trustworthy and detailed information regarding the composition of the iron ores of the country was Mr. S. H. Blackwell, who, in presenting to the Royal School of Mines a very extensive and interesting series of British ores, which he had collected with great labour and expense for exhibition in 1851, placed at the disposal of Dr. Percy the requisite funds for engaging the services of competent analysts (Messrs. J. Spiller and A. H. Dick), who, under his direction and with subsequent pecuniary aid from himself and from Government funds, carried out a very careful and complete examination of this series, the results of which have been of great value for purposes of reference to those actively interested in the iron industry. It was, however, the first connexion of Messrs. Nicholson and D. S. Price and of Mr. E. Riley with two of the most important iron-works of this country, about a quarter of a century ago (*i. e.*, at the time when the above investigation was commenced), that marked, I believe, the commencement of systematic endeavours to apply the results of analytical research to the improvement and regulation of the quality of the products of our iron-works."

The important contributions of Mr. Lothian Bell and Dr. Siemens to the extraordinary progress in the smelting and other furnace operations of recent years received special attention. Gun-cotton and nitro-glycerine, as affording a strong illustration of the practical importance frequently resulting from purely scientific researches, and the study of the explosive forces of gunpowder, as proving the necessity of abolishing the apparent barrier which existed hitherto between physical and chemical work, filled up the concluding portion of the Address.

As a matter of course, the Address had to take notice of what had lately been done in the way of promoting scientific research. The grants of money made by the Government, on the recommendation of the Royal Society, to a number of scientific men were, we are told, most worthily allotted. Yet we find in the list of the fortunate recipients of public money certain younger chemists whose chief labours are those organic researches which had been described with so fine a touch of irony by the President in the earlier part of the Address.

Not a syllable was said about the late Loan Collection of Scientific Instruments. With all his well-known amiable disposition, Prof. Abel could not bring himself to include that ill-starred exhibition among the means for promoting scientific research.

The first of the papers read was Mr. Hartley's 'Report on the Conditions under which Liquid Carbonic Acid exists in Rocks and Minerals.' The Report stated that, in a paper read before the Section at Glasgow, the method of determining the exact temperature at which the carbonic acid which is sometimes found enclosed in the cavities of rocks and minerals became gaseous was described. The Report then went on to show that the temperature known as the "critical point," at which carbonic acid was found in rocks, was 39·92° Centigrade. The acid was found to be contained in minute cavities of the rocks and minerals, and experiments had been tried upon sapphires, garnets, and other precious stones, and the result had been the discovery in these of carbonic acid. A curious fact had also been ascertained, *i. e.*, that certain bubbles in the fluid cavities approached under the influence of heat, whilst others receded. The changes of the carbonic acid from gas to liquid and from liquid to gas were found to be produced by the raising and lowering of the temperature; in some of the cavities, neither the gaseous nor liquid form of the acid was to be found, the cavities being filled simply with water.

Mr. W. H. Watson's paper 'On the Action of various Fatty Oils upon Copper' gave in detail a number of experiments showing the extent to which different oils act upon copper. The result of the experiments seemed to show that paraffin and castor oils have the least action upon copper, and that the action of sperm oil and seal oil is slight. Linseed, almond, olive, sesame, neatsfoot, and colza produced considerable action upon copper, linseed oil being most active. The author concluded from his experiments that the comparative action of different oils cannot be correctly decided in all cases simply from the appearances of the oils after exposure to copper plates, though minute quantities of the metal might be easily detected in most oils from the colour which is produced by such exposure.

Mr. J. Mactear's communication 'On an Improved System of Alkali Manufacture,' treated of the advantages the author's process is stated to possess over the old systems.

Mr. A. H. Allen presented the 'Report of the Committee on Commercial Phosphates and Potash Salts.' The Report detailed the various methods recommended and tried for the discovery and precipitation of phosphoric acid. The committee had carefully considered and reviewed the evidence and communications which they had received on the subject. The committee were inclined to think that magnesium solution employed in precipitation should not greatly exceed that which is absolutely necessary. The Report afterwards proceeded to detail the various methods and the best means of conducting experiments. With reference to the vexed question of reduced phosphates, the committee considered it proved that only such manures as contained iron are liable to "go back," and become insoluble. The Report concluded by a reference to the processes capable of determining these reduced phosphates.

Prof. Barff's paper 'On the Formation of the Black Oxide of Iron on Iron Surfaces for the Prevention of Corrosion' was received with much interest. There is nothing new in the fact that an iron surface will become coated with black oxide on being exposed to the influences of superheated steam, but the application of this to practical purposes is claimed as a novelty.

Mr. Bower, in a letter to Prof. Abel, states, that direct oxidation in air produces a coating equal to that obtained by the agency of superheated steam.

A paper 'On some Candles altered by long Exposure to Sea-water,' by Dr. Gladstone, was one of those curiosities which never fail to make their appearance at the meetings of the British Association. The candles were found submerged off the Spanish coast in 1875, having been on board of a vessel lost in 1702. The wick of these submerged candles had rotted away, leaving scarcely any trace of its existence, while the fatty portion had become a friable heavy mass. The candles bore evidence of having been made by dipping. The most interesting point, however, was that, though these candles had been in contact with practically an unlimited amount of sea-water, and a chemical change between them had been possible, the double decomposition had proceeded so slowly that the reaction was only about half completed at the present time.

Mr. T. Wills made a communication on Arctic Coal. One of the results obtained by the late Arctic Expedition was the discovery of a coal seam near to the winter quarters of the Discovery. The Discovery wintered in a bay on the west side of Robeson Channel, in lat. 81° 44′ N., and long. 65° 3′ W.—now known as the Discovery Bay. Abut two miles from this place, in Grantland, this coal was found in the side of a narrow mountain gorge by Mr. Hart, the Rev. C. Hodson, Lieut. Talford, and Dr. Coppinger. The prevailing rock of the surrounding district was a shingly claystone of very irregular arrangement, but mainly dipping to the westward, and, so far as could be ascertained, devoid of fossils. Vegetation included no less than sixty species of plants. Coal has been brought home by previous expeditions from high latitudes, but not so far north. The coal (a specimen of which was exhibited) has a bright, shiny appearance, is somewhat of a pitchy character, and very brittle. On analysis it could not be distinguished from a bituminous coal of exceedingly good quality, and belongs to the true carboniferous period. It is very similar to coal found in some English coal-fields, and particularly at Chesterfield. It contains 65 per cent. of coke. Mr. Wills had inquired of Dr. Coppinger as to whether it would in future expeditions be possible to utilize this coal. As it has only to be quarried, Dr. Coppinger was of opinion that it might. If ballooning were resorted to in future expeditions, the coal would also be useful for the manufacture of gas.

GEOLOGY.

(SECTION C.)

With Mr. Pengelly as President, it was natural to look forward to an address dealing with bone-caves or some cognate subject. Not that the President is a specialist in the sense of knowing only one branch of his science. It was evident during the meeting, even if to some unknown before, that he was not possessed solely by one idea; but if there be one branch of geological inquiry more than another on which Mr. Pengelly is an authority, that branch is the bone-caves of Devonshire. This was the subject of his Address

The earliest caves explored were those at Oreston, near Plymouth, where bones were found in 1816. The work here was continued till 1822, but, from that date till 1858, little or nothing more was done. In the latter year another cavern was discovered at Oreston, the bones from which seem to have been sadly dispersed. These caves at Oreston seem all to have been "fissure-caverns," filled through open cracks from above.

The great cavern of Devonshire, and that with which Mr. Pengelly's name will be long associated, is Kent's Hole, near Torquay. This is no modern discovery; it is mentioned in a lease dated 1659, and inscriptions on the rock inside go back to 1571. "Judging from numerous objects found on the floor, it was visited by man through mediæval back to pre-Roman times; and, unless the facts exhumed by explorers have been misinterpreted, it was a human home during the era of the mammoth and his contemporaries."

Probably the first to take note of bones within the cave was Mr. Northmore, who found some in 1824. Mr. (now Sir W. C.) Trevelyan soon followed in the work, and had a plate of the bones engraved. The Rev. J. MacEnery first visited the cavern in 1825, and worked for many years at its exploration. Mr. Godwin-Austen and others followed in the work, and, in the year 1864, the British Association appointed a committee to carry on the investigation.

The cavern consists of a number of branching chambers of various shapes and dimensions. The complete succession of deposits, from above downwards, is: (*a*) fallen blocks of limestone, cemented by carbonate of lime; (*b*) dark mud, chiefly composed of decayed vegetable matter (black mould); (*c*) a layer of *granular* stalagmite; (*d*) charred wood, &c. (black band); (*e*) cave earth; (*f*) *crystalline* stalagmite; (*g*) breccia. The series is not always so complete as is here stated; but, wherever all the deposits are found in one and the same vertical section, the order of superposition is clear and invariable, and elsewhere the succession, though defective, is never transgressed.

The highest beds contain bones of animals still living in Devonshire; but when we reach the granular stalagmite, we come across the remains of animals which are no longer found in Britain. Here we find hyæna, rhinoceros, bear, lion, and a host of other animals, and with them the remains of man. In the crystalline stalagmite and the breccia the remains are often exclusively those of the bear, but occasionally bones of the lion and the fox occur. Here, too, remains of man are found, but his implements are of a decidedly ruder type than are those found in the hyæna beds above.

The contents of other caverns were described; amongst them we may note Ansty's-Cove Cavern, Yealm-Bridge Cavern, Ash Hole, Brixham Cavern, and Bench Cavern. Of these probably Brixham is the most important. It was discovered in 1858, and was then untouched; it has been carefully explored by a committee of the Geological Society of London, and a report (by Prof. Prestwich and Mr. Pengelly) has lately been published.

The lesson taught us by these Devonshire Caves is this. The oldest inhabitants yet known were the men who fashioned the rude implements, and who were contemporaries of the bears. The hyæna was not then an inhabitant of this part of Britain, else we should find some traces of his existence. There was then a pause—a change in the conditions under which the deposits were laid down. In the cave earth we again find remains of man; but now he manufactures more finished tools, though still rough and unpolished; for his contemporaries he had the lion, rhinoceros, hyæna, &c. It thus appears that man lived in South Britain before the hyæna did. Was this in pre-glacial or inter-glacial times?

The most important question now before geologists as to the geology of Devonshire is the relation which the so-called Devonian Rocks bear to the true Carboniferous Limestone of the rest of England, and to the Old Red Sandstone of Herefordshire. The Old Red of Hereford rests conformably, or with a continuous succession of beds, upon the highest Silurian Rocks of the same area; it underlies, equally conformably, the lowest carboniferous rocks of that area. Whether or not there be a break in the succession of the Old Red of Hereford, as suggested by Jukes, and as is certainly the case in Scotland, is a point not yet settled. The succession of deposits is clear enough here. As regards the mode of formation of the beds, the Silurians are marine, the Carboniferous Limestone marine, but the Old Red of Hereford is by many regarded as of freshwater origin. In Devonshire we have a great series of marine beds (Devonian) passing under another series (Culm Measures), which are generally believed either to represent the Millstone Grit or to be unproductive coal measures. The question arises—What is the age of the Devonian beds? No undoubted Carboniferous Limestone existing in Devonshire, are we to regard the Devonian Rocks as wholly or in part the equivalents of the Carboniferous Limestone, or as being marine representatives of the Old Red Sandstone? The latter has long been the general opinion, it being also believed that the Carboniferous Limestone did not there exist. Mr. Jukes, a few years before his death, endeavoured to show that this opinion was erroneous. He believed that the true key to the Devonian puzzle was to be found in the south of Ireland, where the rocks, long since studied by Dr. Griffiths, had been recently minutely surveyed by the Geological Survey. In Ireland the Carboniferous Limestone is separated from the Old Red Sandstone by the "Carboniferous Slate." Sometimes the limestone is entirely replaced by slate, which then ranges continuously from the top of the Old Red Sandstone to the base of the coal measures. Mr. Jukes asserted that in this area we can track out the gradual changes of which in England we see only the full results. He said that the Devonian Rocks are the Carboniferous Limestone under another form. He pointed out what he considered to be true Old Red Sandstone at the North Foreland, Minehead, and elsewhere, and showed how, from this base, the succession could be traced upwards into the culm measures. Had the succession been as clear as it is in the south of Ireland, the controversy would long since have been settled; but this is by no means the case. The beds are greatly disturbed, faulted, and perhaps inverted. Mr. Jukes, unfortunately for his theory, endeavoured to explain the difficulties by suggesting the existence of a great fault repeating the beds. Subsequent writers, notable Mr. Etheridge, have shown that this fault-theory is improbable, and hence Mr. Jukes's views have been overburdened by his own arguments.

Mr. Etheridge has also examined in great detail the evidence afforded by the fossils, and he believes that from this point of view alone Mr. Jukes's views are untenable. Sir R. Murchison stoutly opposed the new ideas; but many geologists now look upon them with increasing favour.

This lengthy statement of the present position of the Devonian controversy will, perhaps, serve to make somewhat intelligible the papers on the question now to be noticed. Mr. Pengelly, in the course of a general sketch of the geology of Plymouth (especially of the coast from the Rame Head to the Bolt Tail), expressed his partial acceptance of Prof. Jukes's views. He believed the Upper Old Red Sandstone to be the equivalent of the Lower Devonian, each containing *Phyllolepis concentricus*, which is not found at any other position.

Mr. Pengelly also called attention to the metamorphism which has taken place in the rocks at and near Prawle Point, for which no sufficient cause is now apparent. He supported the suggestion of Holl and Jukes, that south of Prawle Point there may be a boss of granite now submerged, to which the change in the character of the sedimentary rocks is due. In support of this, he spoke of a beach in which many granitoid pebbles occur, but with this exception the pebbles are strictly local; he thought that these pebbles were probably derived from the now submerged granite. The age of the metamorphism is clearly pre-triassic, for the triassic strata of the district contain pebbles of metamorphosed rock.

Mr. A. Champernowne exhibited a beautiful geological map (on the one-inch scale) of part of Devonshire, on which the faults and folds of the rocks were minutely mapped, and he read a lengthy paper, 'On the Succession of the Palæozoic Deposits of South Devon.' As a result of his detailed researches, he had been led in great part to accept Mr. Jukes's views, although the supposed great fault might not exist. On the other hand, smaller faults and inversions helped to establish a perfect continuity of original deposition between rocks which at first sight seem to be unconformable to each other. These points were illustrated by diagrams and photographs of various parts. Mr. Champernowne believed that the chief difference between the Devonian and Carboniferous Limestone will prove to be one of life distribution—a geographical, not a chronological, difference.

Mr. H. B. Woodward, in a paper 'On the Devonian Rocks near Newton Abbot and Torquay,' also gave his support to Mr. Jukes's views. Mr. Woodward has for some time been engaged in the geological survey of the triassic rocks o Somerset and Devon, and in the course of this work he has collected much information regarding the older bed. He showed that the Devonian Rocks are divisible into three groups—limestones above, slates in the middle, and red sandstones below. The limestones appear to end off, die out in many places as though they were lenticular beds lying amongst the other strata. But this is due to faults the existence of which can be clearly proved. The whole evidence tends in favour of the views of Mr. Jukes,—that the basement beds of the Devonian system are truly Old Red Sandstone, while the succeeding slates and limestones were formed during what was called the lower carboniferous period, and in a different zoological province to the Carboniferous Limestone of other parts. The view that the whole of the Devonian rocks were deposited during the same period as the Old Red Sandstone is entirely unsupported by physical evidence; for it requires a barrier to have existed at the time, separating a lacustrine from a purely marine area, and of this there is not the slightest evidence. Indeed, just where we should look for this supposed barrier, we find the curious mass of limestone of Cannington Park, which some call Devonian and some Carboniferous—probably both opinions are correct.

Mr. Clement Reid (also of the Geological Survey) gave a description of the "Junction of the Limestone and Culm Measures near Chudleigh." The appearance of unconformity here is produced by a fault; there is a continuous sequence between the two formations.

Prof. G. Dewalque, whose researches on the Devonian Rocks of Belgium are well known, has recently studied the rocks of North Devon and the Old Red Sandstone of Hereford. As regards North Devon, he believes that the series from Barnstaple to Lynton is complete, and that no portion of the rocks here exposed is repeated by a fault. The sandstones of Baggy Point and Marwood represent portions of the "Psammites du Condros"; the red sandstones of Pickwell Down represent the lower part of these Psammites. The limestone of Ilfracombe represents the "stringocephalus limestone" of Belgium and Germany. This correlation differs but little from that proposed by Mr. Etheridge. Both the Devonian and Carboniferous limestones are more fully developed on the Continent than in the United Kingdom. The Carboniferous Limestone of Belgium is probably in part represented by the beds of Barnstaple and Pilton; both contain similar nodules of chert and silicious concretions.

As regards the Old Red Sandstone, Prof. Dewalque suggested that the beds with impure limestones (cornstones) of Hereford are the equivalents of red shales, sandstones, and conglomerates, which occur (with similar cornstones) in the northern trough, or "bassin de Namur" of the Belgian area. But these Belgian beds are clearly intercalated

between two sets of limestones, one containing *Stringocephalus Burtini*, the other *Spirifer distinctus*. Hence they are undoubtedly marine, and the author believes that the Old Red Sandstone of England is also marine.

Mr. R. N. Worth described the Plymouth limestone and its palæontology. It is a band six and a half miles long and half a mile wide. It was evidently a fringing coral reef. At the western end of the limestone area mollusks are often abundant; at the eastern end they are rare or often absent. Branching corals occur chiefly at the western end, genuine reef-building corals at the eastern end. The causes of these variations were described, and allusion was made to the slates associated with the limestone, and to the caverns and fissures which traverse the limestone.

ANATOMY AND PHYSIOLOGY.

(SECTION D.)

Prof. MacAlister's address was especially devoted to recent embryology. He asserted that since the last meeting of the Association in Plymouth, embryology and physiology had made good their scientific claims, and had established an independent position, instead of being regarded as minor offshoots of medicine. He reviewed the recent researches of Hertwig, Van Beneden, Bütschli, and others on the early history of the ovum, especially referring to the history of the germinal vesicle, the formation of the segmentation nucleus, and the appearance of the spindle-shaped and rayed figures. He next alluded to the question of the origin of the limbs in vertebrates, which in several cases were not found to arise as special protuberances from a continuous lateral ridge on each side of the body. He discussed the theories advanced to account for the possession of two pairs of limbs only, supposing that vertebrates had been evolved from annelid-like ancestors. He thought it quite possible that the dorsal, caudal, and anal fins of fishes were derived from originally segmental appendages, and that they were produced by the coalescence of right and left members which were formerly distinct. In relation to human anatomy, Prof. MacAlister remarked that each year could show comparatively little progress in a field so long and well cultivated. Yet it was astonishing that considerable uncertainty still prevailed on questions of minuter anatomy. There was also great lack of accurate observations on variable parts; and it was very desirable that more certain statements should be attainable on many points, and that of different conditions the proportion of cases in which each occurred should be known. Considering the great number of subjects annually dissected, very little observational work was really done; and it was chiefly to Prof. Wenzel Grüber, of St. Petersburg, the prince of human anatomists, that we looked for careful and valuable records of interesting variations in the human body.

Prof. McKendrick gave a valuable account of his experiments with Dr. Ramsay on the physiological action of substitution compounds obtained from chinoline and pyridine. Chinoline, C_7H_9N, was obtained from quinine by the action of caustic potash, and also from coal-tar, with some chemical and physical distinctions, but no ascertainable physiological differences. The substitution compounds obtained from chinoline had a constant increment of CH_2. When about three grains of the chloride of chinoline were introduced under the skin of a rabbit of four pounds weight, it soon became dull, then fell on one side, and in six or eight minutes was unconscious; all reflex movements were abolished. The heart continued to pulsate with considerable force, and respiration was vigorous. After two or three hours the animal usually recovered. There was no irritation of the motor centres, and thus chinoline might be of great value as an anæsthetic, because it interfered so little with the heart and respiration. In passing from the lower to the higher compounds of the series, as the molecular weight increased, cerebral symptoms became less and less manifest, and motor actions more declared. With the highest compounds death resulted quickly, attended with severe tetanic convulsions; and much smaller quantities produced these effects. Further derivatives, such as ethyl chinoline and amyl chinoline, had most active physiological properties, with the distinction that they increased the reflex activity of the spinal cord. The pyridine series, C_5H_5N, increasing also by CH_2 in successive members, had an intoxicating effect; and the higher compounds acted more and more on the sensory centres. Dipyridine, having double the molecular formula of pyridine, had much stronger action, producing severe convulsions, and affecting the respiratory apparatus. The substitution derivatives also had a more intense activity than the simple members of the series. $C_{14}H_{18}N_2$ was intensely poisonous: half a grain quickly killed a rabbit. Dicarbopyridenic acid $C_{10}H_8N_2O_3$ had a smell like nicotine, and was very analogous in composition. It was the most poisonous of these compounds, producing symptoms something like prussic acid, with convulsions of an epileptiform character. The object in these inquiries was to find bodies of artificial construction that should have similar constitution and action to the important plant-alkaloids; and thus their artificial manufacture could be instituted.

Mr. G. T. Bettany, of Caius College, Cambridge, read a paper on the structure of the vertebrate skull, giving an account of conclusions recently arrived at by Prof. W. K. Parker and himself. It was considered that the absence of distinct protovertebræ in the early history of the skull was not of so much importance as it had been formerly considered, since it was found that such a small proportion of the substance of the protovertebræ actually went to form the permanent vertebræ, and that distinct muscle segments had been observed in the skulls of various animals. The only portion of the tissue of the skull that really answered to the main part of the vertebral bodies was a small tube of tissue surrounding the notochord. The rest was really comparable to the arches of the vertebræ, in a continuous form, with interspaces for the emergence of nerves. The trabeculæ could not be identified with the visceral arches of the face, but were strictly similar in all their relations to the cartilages at the base of the hinder part of the skull. The curved position of the trabeculæ during the early cranial flexure gave rise to the impression that they were different in nature from these hinder cartilages. Reasons were given for considering that the skull was really composed of a large number of segments of the body, the number of which could not be definitely stated. The relations of the scale and membrane bones to the segmental structure of the body and the gradual evolution of the skull were dealt with; and the segmentation of the skull was treated at considerable length. It was believed by the authors that distinct segments could not be made out in the skull in the lower groups of vertebrates, and that names could not be given to the bones of their skulls, derived from the nomenclature of vertebræ. It was only in the mammalia that distinct segments could be made out, but it could not be proved that these segments corresponded to primitive body-segments, or to vertebræ. There was strong reason to believe that the basi-occipital bone was equivalent to several vertebræ. Profs. Allen Thomson, Redfern, and MacAlister took part in the discussion, speaking in the highest terms of Prof. Parker's researches, and agreeing in the rejection of the trabeculæ as visceral arches.

ANTHROPOLOGY.

(SECTION D.)

In spite of a good deal of gloomy foreboding, anthropology did not come off at all badly at Plymouth. Early in the year it was understood that Mr. Francis Galton would preside in this department; but it was soon afterwards rumoured, among those who knew the working of the arrangements, that illness in his family would probably interfere with his acceptance of the office. Sir Walter Elliot was consequently nominated in the stead of Mr. Galton, and people were beginning to look forward to an address on Indian ethnology. Unfortunately, however, Sir Walter was seized a few weeks ago with an illness which rendered rest absolutely necessary, and the Council had once more to turn to Mr. Galton. Under these circumstances it would hardly have been surprising if anthropology had fallen through at the present meeting. So far, however, from this having been the case, the Anthropological Department held a most successful session, sitting, indeed, at times when other Sections were abandoned to pleasure.

Although Mr. Galton was thus called upon suddenly to prepare his Address, he proved himself in every way equal to the occasion. The Address is eminently characteristic of the man. Dealing with the psychological side of anthropology, it attempts to classify men according to their mental characteristics; not indeed in the loose way commonly done, but in accordance with the requirements of strict science. Whilst the physical anthropologist bases his groups on external characteristics, such as the shape of the skull and the colour of the hair and eyes, the psychologist should seek to correlate these structural characteristics with peculiarities of mental constitution. To do this, it is of first importance to reduce the faculties of mind to direct measurement. The progress of modern psycho-physics shows that, to use Mr. Galton's words, "the very foundations of the differences between the mental qualities of man and man admit of being gauged by a scale of inches and a clock."

For example, it has been shown experimentally that a sensation travels along a nerve to the brain, or a volition from the brain to a muscle, not instantaneously, but at a rate not exceeding the velocity of an express train on our railways. This probably explains why a small animal is often able to evade a blow more rapidly than a larger animal, the impression having of course less distance to travel in the former than in the latter. Hence, too, we see why the eye and ear should be placed in the head of an animal, where but little time will be occupied in transmitting a sensation from the outer world to the sensorium. It can hardly be doubted that there are great differences in the velocity of transmission in different individuals, and it is extremely desirable to correlate such differences with characteristics of temperament and with peculiarities of physical structure. A certain event occurs in the presence of two men: one perceives it with lightning like rapidity; the other perceives it only sluggishly. In careful astronomical observations this difference is always noted, and leads to what is called the "personal equation" of the observer. Mr. Galton suggests that the magnitude of this equation should be compared with the observer's age, height, weight, colour of hair and eyes, and temperament.

Having obtained a group of individuals bound together by the possession of similar mental characteristics, it is necessary to closely compare their physical conformation. With respect to anthropometric measurements Mr. Galton has not much to say; but with reference to anthropological photographs, he suggests that they should be taken from *three* points in planes at right angles to each other, thus giving a full-face portrait, a profile, and a view at the back of the head; these would, of course, correspond with the architect's elevation, side view, and plan of a building.

From a number of photographs presenting similar general characters, yet differing in minor details, the typical characteristics, or those of the average member of the group, might be obtained by a process of optical superposition. The separate portraits must be blended, and the mean then taken. Mr. Galton possesses a large number of photographs of notorious criminals, and from these he has sought to determine what features are common to persons of similar evil propensities.

Three peculiarities of character may be detected in the typical criminal; his instincts are vicious, he is deficient of conscience, and he possesses only

feeble self-control. All these peculiarities tend to become hereditary, and thus criminal propensities may be perpetuated in a family for successive generations. Mr. Galton referred to the well-known case of the Jukes family in America, which strikingly illustrate the hereditary transmission of criminal instincts. In seven generations there were 540 individuals of the Jukes blood, and among them an enormous proportion went to the bad in one way or another. Mr. Galton has, on other occasions, told us a great deal about the nature and nurture of men of science, and of others who stand out among the glory of mankind; but, on this occasion, he has turned to the gloomy side of human nature, and has studied hereditary crime instead of hereditary genius. Unpleasant as the subject may seem, it is one of great importance in a civilized community, for the perpetuation of bad mental characteristics is more injurious to the State than the perpetuation of bad physical characteristics. Possibly, by judicious selection, the evil instincts might be softened down or even obliterated in the course of a few generations; but it is certain that, by injudicious selection, they may be greatly intensified. In fact, whether we look to the hereditary transmission of unfavourable physical or unfavourable mental characteristics, we are forcibly reminded of the profound saying of the Irish doctor, "You can't be too careful in the selection of your parents"!

One of the great benefits which the British Association confers upon science consists in the granting of sums of money for the purpose of carrying out various scientific investigations. Anthropological research is to be reckoned among those branches of science which have received assistance. At the last meeting a committee was appointed for the purpose of exploring ancient earthworks and other pre-historic remains, and a sum of 25*l.* was placed at the disposal of the committee to carry out its object. No one can deny that this has been an excellent investment; for the Report presented by Col. Lane Fox and Prof. Rolleston showed that a great amount of good work has been accomplished with this very small sum. Part of the money has been expended on some excavations at Cadbury, in Somersetshire, and part is to be devoted to explorations in Sussex. Another committee seeks to obtain a great collection of anthropometric measurements of inhabitants of the British Islands. It has, in fact, dawned upon the perception of certain scientific folk that, while we are sending to the uttermost parts of the earth in quest of scientific data, we really know but very little about the population of our own islands. The Anthropometric Committee of the British Association seeks to supply this want, and has already done a good deal; but as the committee was formed in the Statistical Section, although its Report was read in the Anthropological Department, any further reference to its labours is unnecessary in this place. We will, therefore, content ourselves with observing that some excellent hints as to anthropological photographs were submitted to the department by Mr. Brabrook, the Director of the Anthropological Institute.

Altogether, about thirty papers were read in the Department of Anthropology during the five days on which it held sittings. A selection of these will be noticed in our next issue, and all we purpose to do in the present article is to single out one paper which merits special notice, not so much on account of its originality, for it is confessedly a compilation, as for the fact that it has been written by a lady. *Place aux dames!*

Miss A. W. Buckland offered to the department some 'Ethnological Hints afforded by the Stimulants of the Ancient and Modern Savages.' From a very early period in the history of mankind, some sort of stimulant has been almost universally used. Among the lower races it consists simply of some leaf or root chewed for its exhilarating properties, such as the coca leaf of South America. But when a people advances to the agricultural stage, it usually brews a fermented drink from the roots or grain cultivated for food; hence the ancient Egyptians brewed a beer similar indeed, to the liquor which still forms the chief beverage of most African races. In China and Japan it is rice which is used for the preparation of stimulating beverages in place of wheat and barley; while in America the grain generally used for this purpose is maize. In order to promote fermentation, the liquid is frequently chewed, so that the ptyalin of the saliva may act as a ferment; this is done, for example, in Bolivia, and, as every one knows, is largely practised by the South Sea Islanders in the preparation of their disgusting "kava." The "koumiss," or fermented mare's milk of the pastoral tribes of Central Asia, has its analogue among the Kaffirs of South Africa. In the higher stages of civilization the juice of the grape supplanted all other liquids.

ZOOLOGY AND BOTANY.

(SECTION D.)

Mr. Gwyn Jeffreys, who presided over this Section, devoted himself principally to the Department of Zoology and Botany. His Address to the Section referred to recent advances in our knowledge of the deep-sea mollusca. He proposed the term "abyssal" for depths between 100 and 1,000 fathoms, and "benthal" (from βένθος) for depths of 1,000 fathoms and more. He furnished a list of benthal mollusca dredged by himself in the Valorous, a considerable number of which were previously known as fossils. Forty-nine out of seventy-five, however, were entirely new species, and a considerable number from the Porcupine expedition still remained undescribed. These benthal mollusca were certainly peculiar, constituting part of a distinct Fauna. They were not always of small size. In the Porcupine expedition of 1869 the dredge brought up, at a depth of 1,207 fathoms, in the Bay of Biscay, a living specimen of *Fusus attenuatus*, which measured two and a quarter inches in length. In the Challenger expedition there was trawled, at a depth of 1,600 fathoms, in the South Atlantic, a living specimen of a magnificent shell of Cymbium or an allied genus, six and three quarters inches long and four inches broad. The distribution of the deep-sea mollusca was unquestionably caused by submarine currents, respecting which there is great ignorance. Mr. Jeffreys was inclined to think from the distribution of the Atlantic mollusca that the Arctic and Antarctic currents did not cross the Equator.

Mr. Jeffreys devoted a good deal of his Address to the question of the supposed continuity of the chalk. He stated that he would not express a definite opinion, but would only state a few facts; however, he evidently inclined against the continuity. First as to mineral composition, the deep-sea ooze differed really notably from chalk. Then the chalk Fauna, judged by the mollusca, appeared to be comparatively a shallow-water one. He presented lists of the forms of mollusca in the chalk marl, lower chalk, and upper chalk; and it was found that none of the genera were deep-water. Chama, Ostræa, Pinna, Calyptræa, and Patella could not be deep-water; and the old proverb, "Noscitur ex sociis," would apply to mollusks as well as to men. Not a single species of Leda, Neæra, Solenoconchia, or of the Bulla family occurred in the upper or white chalk, although they now inhabit the deep-sea ooze, and especially characterize the modern deposit. Even Nautilus and Spirula were not proved to be deep-sea forms. Nautilus shells were cast ashore in the Indian Ocean and South Pacific; and Mr. Jeffreys was not aware of a single instance of a deep-water mollusk being cast ashore. Spirula was thrown up on many shores. It was often captured alive in the Persian Gulf, which has nowhere a depth above forty or fifty fathoms. Mr. Woodward further states that the chalk crustacea are shallow-water forms.

Mr. Jeffreys could not identify a single species of cretaceous mollusca as now living or recent. All of them are evidently tropical forms. The *Terebratula striata* was identified by some with *T. caput-serpentis*, but he could not concur in that identification. The question, however, depended on the capability of hereditary persistence which some species possessed; and although a certain degree of modification might be caused by an alteration of conditions in the course of incalculable ages, knowledge was not sufficient to enable us to take for granted the transmutation of species. He was not a believer in the extinction of species, nor in their periodical extinction and replacement by other species. The notorious imperfection of the geological record ought to be a warning against hasty generalization. Not merely were our means of geological information restricted to those outer layers of the earth that were within our sight, but nearly three-fourths of its surface were inaccessible to us, being covered by the sea. It was impossible even to guess what strata underlay the bottom of the ocean, or when the latter attained its present position relatively to that of the land.

The Report of the Close Time Committee reviewed the course of recent legislation on the subject, and its beneficial effects. The passing this year of the Oysters, Crabs, and Lobsters Bill was alluded to with much satisfaction. Mr. Gwyn Jeffreys said that every native female oyster spawned from 500,000 to 1,000,000 ova every year, and if these were protected there was no reason why oysters should not soon be obtainable at a halfpenny a dozen. Mr. Spence Bate spoke of the prejudice in favour of eating lobsters taken with the "berry." In the market they produced twice the price of those without it. The deposit of ova by the lobster extended over such a lengthened period that he thought it impracticable to protect them during the whole of it; but if the time when spawning chiefly went on were ascertained, protection might be established for that period. Oyster beds often ceased to exist from the oysters being killed, or dying out owing to a change in conditions; overdredging did not seem to have produced so much injury.

Mr. Spence Bate's third report on the present state of our knowledge of the Crustacea dealt minutely with the organs of sight and hearing, and with the processes of moulting.

Mr. Archer-Briggs read a paper on the Roses of the neighbourhood of Plymouth, identifying a great number of distinct species or varieties and mapping out their geographical distribution.

GEOGRAPHY.

(SECTION E.)

The theme of the opening address of the President to this Section was the progress made by geography and geographical discovery since the British Association last met in Plymouth, in 1841. After alluding to the increased attention paid to physical geography, he proceeded to say that geographical science had of late years received considerable impulse from the establishment of new societies on the Continent, and more especially from the inauguration of international congresses, which were inaugurated in the renowned city of Antwerp in 1871, the native place of Mercator. The second congress was held in Paris in 1875, and was equally satisfactory in its results. The first fruits that have been already gathered from the effect of international co-operation have been the establishment between nations of a common interest in the great expeditions of discovery, the improvement of instruments adapted to the particular needs of travellers and navigators, and of the methods of delineation adopted for maps and charts.

An excellent opportunity of comparing the position and methods of the past with those of the present day, in all that relates to geographical investigation, was also afforded by the Loan Exhibition of Scientific Instruments and Appliances at South Kensington last year. The visitor to that exhibition was able to compare the astrolabe of Sir Francis Drake and of the mariners who steered the Spanish Armada to the coast of England; the back-staff of John Davis; the quadrant of Hadley and of Captain Cook, with the finished specimens of the sextant of this day; the compass of Galileo with the standard compass of the Admiralty, cor-

rected by the Astronomer Royal, for use on board iron ships, and with the light multiple needle of Sir William Thomson. The collection of maps, charts, and models then exhibited effectually demonstrated all that has been said concerning the advance of geographical science. Here was to be seen a copy of the chart of the coast of America discovered by Columbus on his second voyage, made by the pilot who accompanied him; a chronometer which belonged to Capt. Cook, in his voyage of 1776, and was again taken to the Pacific by Capt. Bligh in the Bounty, 1787; afterwards taken possession of by the mutineers at Pitcairn's Island, and sold in 1808 by Adam to a citizen of the United States at Chili, where it was purchased by Capt. Sir Thomas Herbert, R.N. The manuscript maps of Livingstone, together with the instruments used by that great African traveller on his last journey, were exhibited, and what was of personal interest to him (the President) was "the first traces ever found of the Franklin Expedition," discovered by Capt. E. Ommanney, H.M.S. Assistance, on the 23rd of August, 1850, at Franklin's first winter quarters near Beechey Island. In the year 1841 the triangulation of the British Islands was in progress; the great base line on Salisbury Plain, which was to be made the test of the accuracy of the work, remained to be surveyed; this base was laid down in 1849. The primary base line, on the margin of Lough Foyle, was measured in 1827; the base on Salisbury Plain was 300 miles, and its length in the first instance was computed by a connected series of triangles projected on from Lough Foyle. When this base was measured by the standard compensation base, it was found that the actual measurement agreed within five inches of the length computed by the triangulation and trigonometry; this fairly expresses the accuracy which had now been introduced into this branch of surveying. The English triangulation was connected with the systems of France and Belgium in 1862, and in 1865 a remarkable International Congress was held at Southampton, in which town the standards of linear measure of England, India, Russia, Belgium, Prussia, Austria, Spain, Italy, and the United States were compared with each other as a preliminary to a measurement of a great arc of a parallel of latitude. In the very year in which the British Association last met at Plymouth, the arc of India, which extends from Cape Comorin to the Himalaya, was completed. In 1867 a base line was measured at Bangalore, which was found to be within a quarter of an inch of the length that had been assigned to it by a series of triangles from Vizagapatam. The detailed plan of the survey of London was completed on 326 sheets, in 1871. General Dufour brought out his celebrated map of Switzerland, in twenty-five sheets; this is one of the finest specimens of mapping the physical features of a country ever accomplished. In the work of hydrographical progress we had ample reason to be proud of all that has been accomplished by this country, under the direction of those eminent hydrographers of the Admiralty, Beaufort, Richards, Evans. But although our maritime surveyors had accomplished mighty work in the examination and accurate mapping of a very extensive proportion of the coasts on our globe, there remained a large amount of interesting work yet to do; for the "unsurveyed world" is of considerable extent, and new routes are opened up to the commercial world in unfrequented seas, which demand the careful examination of the skilled marine surveyor. The United States Coast Survey is exemplary to all nations as regards the method of carrying out this great work. The Reports made to Congress for the last quarter of a century contain matter of surprising interest, both to the mariner and the scientist. Every new object is there recorded with minute precision, an enormous amount of information is furnished on meteorology, magnetism, tides and currents, as well as on hydrography and geography; including such discussions as the causes of the increase and decrease of coral reefs, and other questions of natural history, and the complete investigation of the Gulf Stream; in short, it is a work nobly organized and executed, truly worthy of a great maritime nation.

At the very time that the British Association was holding its last meeting at Plymouth, Capt. James C. Ross was engaged on his memorable expedition into the Antarctic Sea. This expedition was sent forth by a representation from the British Association, in 1838, regarding the necessity of magnetic observations in the southern hemisphere, in connexion with a system of simultaneous observations which were being conducted at fixed stations at various points on the earth's surface. It set out in August, 1839, and returned in September, 1843, bringing results of the highest importance, the crowning feature being the discovery of Victoria Land, lying between the parallels of 70° S. and 78° S., with two high mountains named Erebus and Terror, being respectively 12,400 and 10,900 feet elevation above the level of the sea, Erebus being a volcano in full action, emitting flame and smoke in awful majesty amidst its glacial solitudes. The position of the south magnetic pole was laid within the icy barrier, and approximately determined when in lat. 76° 12′ S., and long. 164° E.; the magnetic dip there observed was 88° 40′; it was assigned to be 160 miles from the ship on the 17th February, 1841. Meteorological observations of great value were also made, and the fact established that a lower barometric pressure exists in the southern hemisphere than in the northern.

The Address then passed in review the various Arctic expeditions which had been undertaken since 1841, at which date Franklin had not started on his memorable attempt to force the North-West Passage from the Atlantic to the Pacific Ocean, and the coast line of Arctic America had not been completely explored. Nor was it then known whether the projecting mass of Boothia was connected with the American continent, or whether the neighbouring King William's Land was an island or a peninsula. The exploits of Americans, Swedes, and Germans in this exciting field of geographical discovery and adventure were next narrated. England, the President continued, could not look on idly and see other nations striving to eclipse her Arctic fame, and repeated applications from the Royal Geographical and other learned Societies, supported by the British Association, resulted in Government granting the expedition which has so recently been conducted with so much credit under Nares and Stephenson. The Alert and Discovery set forth in May, 1875, with the unanimous good wishes of the nation for success. The expedition left most amply provided for the perilous service, and in the passage through Baffin's Bay, so far as Smith's Sound, was highly favoured with an open navigation, and on the 28th July reached Port Foulke at the entrance of Smith's Sound. The rest of the navigation season was one repeated struggle with heavy ice-floes, icebergs, and packed ice, in which the ships were sometimes for days beset. On August 25th the Discovery was placed in a harbour well suited for wintering, and the Alert advanced alone, contending against currents and massive floe ice. On September 1st, aided by a south-west gale, a passage was opened which enabled Nares to clear the Robeson Channel, and attain the latitude of 82° 24′ N. He found himself confronting the circumpolar sea, filled with packed ice, varying from 80 to 100 feet in thickness, which arrested all hopes of advancing further north, and, what was a greater source of disappointment, not a glimpse of land could be discerned northward. Struggling amongst the formidable floe bergs, a station was gained on the coast in lat. 82° 27′, and under the protection of heavy grounded ice, the Alert was secured for the winter. Thus was the British flag the first time carried into the circumpolar sea, so aptly termed the Palæocrystic Sea. The ship had been navigated with a skill and courage never surpassed, and advantage taken of every piece of open water to the limit where navigation ceases. A winter followed in which the sun disappeared for 135 days, and a minimum temperature of 73·7° below zero was registered.

The geographical results of this voyage are the addition of about 400 miles to our knowledge of the coast of this circumpolar sea, which have been accurately laid down, and the physical features and productions of the region described. As an Arctic voyager, he (the President) expressed his unqualified approval of the conduct of Capt. Nares in his decision to return home; in fact, nothing could have been gained by his remaining out another season, and the able seamanship displayed in effecting the escape from such a perilous position was admirable; and it is important to remember that the three previous expeditions into this dangerous channel all ended in disaster and the abandonment of the vessels. Before quitting these glacial regions, he would venture to give his opinion with reference to future exploration. He never was sanguine as to the success generally expected by the advocates of the Smith's Sound route. By the valuable information brought home by Nares as to the physical conditions of the palæocrystic ice, which doubtless occupied all the circumpolar area within the eighty-third parallel, all ideas of reaching the Pole from that direction, or anywhere north of the Parry group, might be discarded. This formidable ice would arrest the voyager sooner or later in navigating towards the Pole. Instead of the nations racing for the Pole, let them accomplish what is practicable. To complete the coast line of North Greenland would be interesting to all geographers, that is, to connect the coast between Beaumont's farthest and Koldewey's north limit of discovery at Cape Bismarck, which might be accomplished from a winter station on the east coast. A scientific survey of Franz-Josef Land would also be of great service to the interests of science. Payer observed a navigable sea from his extreme north position at Cape Fligely, between him and Oscar Land; research in that direction appeared to hold out a hope of success in finding more land in that region. The Swedes were now preparing an expedition to make a passage from Nova Zembla along the Siberian coast to Behring's Straits, which also would be a great thing to accomplish, and would yield scientific results of great importance in a part of the Arctic area of which at present we have scarcely any knowledge.

The laying of telegraphic cables along the bed of the ocean led naturally to the desire for more thorough knowledge of the deep sea. This desire culminated in the Challenger Expedition under Nares and Wyville Thomson. By this memorable expedition Dr. Carpenter's hypothesis of the vertical circulation of the ocean was substantially confirmed. It was found that the old idea of an uniform deep-sea temperature of 39° was an error, which had been caused by the derangement of the readings of the old unguarded thermometers under the pressure of the water of the deep sea, and that a temperature of 32° prevails at deep ocean bottoms, even at the equator, the cold there being due to a constant underflow of dense water from the polar seas towards the equator. But, wherever the deep basins are protected from the cold lower currents by comparatively elevated ridges of rock, the deep soundings give warm water in the place of cold. This was remarkably instanced in the Gulf of Mexico, and in the ridge-protected basins of the Banda, Celebes, and Sulu seas. The temperature was found to be 50° at 1,800 fathoms in the Sulu Sea, although in the neighbouring open China Sea it was 37° at only 900 fathoms. In the Atlantic the very interesting fact has been determined by the Challenger soundings that the basin of the ocean is divided into two subordinate troughs by a submarine ridge running from south to north through the Dolphin Rise and the Azores, to the shallow water which bounds the Atlantic to the north. The average depth of the Atlantic seems to be within 2,640 fathoms, or three miles. The deepest sounding in the Atlantic was in a depression lying 100 miles north of St. Thomas, where the bottom was reached at 3,800 fathoms, or four and a quarter miles. The deepest sounding

in the Pacific was midway between New Guinea and Japan, in 11° N. and 143° E., where the bottom was reached at a depth of 4,475 fathoms, or 450 feet more than five miles. Very near to this the temperature of the deep sea was found to be 33·9°. In this deepest sounding one of the thermometers was broken, but red clay was brought up from the bottom. Throughout the long examination of the ocean depths by the Challenger, the conclusion was amply confirmed that there is animal life at all depths. Maritime meteorology, which has resolved itself into a distinct subject of investigation, is being conducted in this country under the direction of Mr. Robert H. Scott, F.R.S., and the Meteorological Committee. International conferences were organized at Brussels in 1859, when suggestions for a uniform system of meteorological observations at sea were adopted for observance by the navies and mercantile marine of all nations, the patient and laborious collating from the returns and logs of ships made by Admiral FitzRoy having produced those descriptive "Track Charts" and Pilot Charts which tended to curtail the length of voyages and avoid disaster. And under Admiral Richards, Hydrographer of the Admiralty, there was published a work containing a set of charts showing the winds and currents of the oceans on the surface of the globe, which has been highly valued as a work of reference by the navigator. The journal published by the Meteorological Committee elaborately discusses all the materials collected on the subject of ocean meteorology.

Passing next to Africa, the obstacles to be overcome by the traveller were very different from those enumerated in the Arctic wastes, but scarcely less terrible to encounter. At the date of the former meeting at Plymouth in 1841, we had nothing but speculations as to the sources of the Nile, the region of the tropical lakes was unexplored, and the whole river system imperfectly known. Later on, in 1845, we find Murchison, in one of his early addresses, observing, "It would be difficult to instance any part of this world whose streams have given rise to greater diversity of opinion respecting their course; thus, upon the whole, we have a most limited knowledge of Africa, and that little confined almost exclusively to the coast; in the interior we are nearly as ignorant as we ever were." But this ignorance did not last long; very soon after this time we find Livingstone crossing Africa from Loanda on the Atlantic to Quillimane, near the mouth of the Zambesi, exploring the lakes of Ngami and the Nyassa, discovering the grand and majestic Victoria Falls, rivalled only by the Niagara. Then came in rapid succession those giants of travel, Burton, Speke, Grant, and Baker, unveiling to the civilized world the hidden mystery of all historic time, the sources of the Nile in that great equatorial system of lakes—Victoria Nyanza, Albert Nyanza, and Tanganyika. In 1849 Barth, Overweg, and Richardson travelled the desert of Sahara to Timbuctu, and navigated the Lake Chad, studded with its hundred islands. Almost simultaneously Rebmann, Krapf, and Von Der Decken started from Mombaz on the east coast in 4° S., and discovered the snow-clad mountains of Kilimanjaro and Kenia, which rise to 22,000 feet high between Victoria Nyanza and the Indian Ocean, capped with perpetual snow. Of late years the heart of Africa has been traversed by those highly gifted travellers Nachtigal and Schweinfürth, who have collected such ample information on the ethnology, botany, and natural products of vast interior regions previously unexplored. Livingstone's last work of enduring toil, after he left England in 1866, was the discovery of the lakes Moero and Banguelo, and following the watercourse of the Lualaba northward to Nyangwé. On his death public feeling, not only in this country, but abroad, was deeply stirred on behalf of Africa and its inhabitants. The wonderful journeys of Cameron and Stanley, and the great work accomplished by Gordon, only served to increase the interest.

The large measure of success which has attended their explorations has been succeeded by a desire to civilize the unhappy people, and free them from the horrors of barbarism and slavery. Missions have been successfully planted on the Nyassa, and the Church Missionary Society have commenced operations to construct a road into the interior from Bagamoyo, and despatched a mission to be established on the Victoria Nyanza. But the most important movement of this kind is the international association initiated last autumn by His Majesty the King of the Belgians at a congress held in Brussels, attended by Sir Rutherford Alcock, Sir Henry Rawlinson, and many leading British geographers. In consequence of this, the Council of the Royal Geographical Society have been led to found an African Exploration Fund, for the further and more systematic exploration of the African interior. The fund is to be administered by an executive committee of the Council of the Society.

On the conclusion of the Address, Dr. M. Lindeman read a paper, drawn up by Dr. O. Finsch, on the German Expedition to Western Siberia, organized at Bremen in the summer of 1876, for the object of exploring the isthmus which separates the river Obi, near Obdorsk, from Kara Bay. The expeditionary party consisted of Dr. Finsch, Count Waldburgzeil, and Dr. Brehm. On their outward journey from Moscow they made a long detour southward towards the Altai, before descending the Obi; passing through Kasan, Ekaterinburg, and Tjumen to Tobolsk; thence, crossing the Irtish on the ice (in early April), to Omsk, Semipalatinsk, and Lake Zaisan. Turning to the northward they travelled *viâ* Barnaul to Tomsk, and embarked on the Obi, at the latter place, for Samarow, where a *lotka* or decked boat, propelled chiefly by oars, was placed at their disposal for their work of exploration. Nine days on board this craft brought them to Obdorsk, whence they proceeded to ascend the Chuya, a considerable tributary which drains the eastern side of the isthmus, and seemed to hold out promise of a navigable route over a considerable portion of the interval separating the navigable waters of the great river from the Arctic Ocean, at a point accessible by trading ships from Western Europe. The object of the expedition (which was preceded in the same month by a Russian party having the same mission) was to ascend this river as far as practicable, and thence find the nearest and best road, by river as it was hoped, to the sea at Kara Bay. The navigation of the Obi downward from Obdorsk was exciting, owing to the immense waves of the giant river, which so terrified the native crew that they would gladly have returned had they not been bound by contract. The vessel kept close under the right bank, which presented high steep walls of clay or sand, the opposite (left) bank being low and fringed with forest, beyond which rise in picturesque beauty the snow-covered summits of the Ural mountains. Their first halting-place was Knidski-Yursti, a station composed of five or six Ostiak houses constructed of timber, and the chief residence of the venerable Ostiak prince, Iwan Teiscin. The reindeer herd of the prince had been reduced from 7,000 in number to 700 through the rinderpest, which had caused great havoc amongst these valuable animals. Continuing their voyage they reached Kiochat, an important fishing-station; here were seen block-houses, huts built of twigs and turf, pointed tents or wigwams, called *Jums*, constructed of birch-bark, nets spread out to dry, fishing-tackle in great variety, and the varied people engaged in the fishery—Russians, Siranes, Ostiaks, Samoiedes, with their women, children, and dogs,—forming a scene of great animation in the midst of these northern solitudes. The boldness of the sea-gulls amused them greatly, flying about in numbers, and with hoarse screechings trying to rob the fishermen of their booty out of their very nets. From Kiochat they crossed the great Obi, and entered upon the tranquil waters of the small Obi, which at that season formed a perfect labyrinth of channels swollen by inundation, which rendered it difficult to map its course. The channels are bordered on both sides by tall willows. Here, as everywhere on their river voyage, the gnats proved a terrible annoyance, owing to their immense numbers and blood-thirstiness. Fishing-stations were met with on the lesser Obi at tolerably regular intervals of about ten miles. On the 18th of July they arrived at a station near the western mouth of the Chuya, but were unable to obtain any information as to the course of the river from the natives residing there.

They continued their journey down the Obi until they reached, at Yanburri, the eastern mouth of the Chuya. Yanburri is the last fishing-station on the Obi. All these stations are tenanted only in the summer months, from June to the middle of September. None of them are permanent, and the names marked as such on maps are only misleading. Ascending the Chuya they found the banks presenting the character of tundras. At a native village on the river they procured two guides, one an Ostiak, the other a Samoiede, and proceeded onward to the Sort-johan-johort, or bifurcation, where they arrived on the 20th. After four days' further travelling they reached Junshi, a settlement of the Ostiaks, from the headman of which, who had lived here for four years, they obtained some valuable information regarding the stream. He told them the waters would soon begin to subside and that their vessel would be unable to proceed on account of the shallows and sandbanks. They had not yet reached the northern limit of the growth of trees; on the contrary, the larch still flourished, and the low flat districts were covered in places with an impenetrable growth of willows and alders. The river itself is excessively tortuous, the bends being very numerous and so abrupt that at the end of a day's journey they were not out of sight of their starting-place of the morning. On the 25th the country became more hilly and the river narrower and shallower, and on the following day they reached the limits of navigation. The further journey was continued by land towards the Podarata. Trees were now no longer met with, and a desolate tundra was entered upon, the surface of which was covered with moss and the small dwarf birch. On the 30th they reached the camp of an Ostiak chief, whose reindeer herd had been reduced from 2,000 head to 500 by the terrible rinderpest, which threatens to destroy the whole of the reindeer in Northern Siberia and thus deprive the inhabitants of almost their only means of subsistence. The party saw on the day of their arrival eighty fine animals lying dead near the native huts, and thirty more died before the next morning. The chief ceded nine reindeer and three sledges to enable the party to continue their journey over the monotonous tundra, which was here and there varied with pools and bogs, forcing them to make long detours. Animal life was not very varied, the lemming, gulls of two species, the golden plover, and the ptarmigan being the chief species met with. On the 2nd they sighted the waters of Kara Bay, and in the evening arrived on the banks of the Podarata, which flows into the bay. It had been hoped that this river would prove navigable for a considerable distance, so that a portage of moderate length to the Chuya might only be required in the expected trade route across the isthmus, but it was found to be too shallow a stream for such a purpose. All their efforts to reach the seashore proved ineffectual. From a look-out on an eminence they saw before them a vast swampy plain reaching to the sea, intersected by rivulets and bounded on the west by the mountains of Sadapai. Only to the east it appeared practicable to reach the bay by a long detour. The Podarata seemed to lose itself in the wilderness of swamps before reaching the bay. Provisions failed and the natives refused to go any further, and so they resolved to return.

Nor was the Russian Expedition more successful. Returning south, the German party skirted the low, bare, granitic range of Yangana-pei—a spur of the Urals. These elevations, and the hills which traverse the mossy tundras, proved to the party the utter impossibility of the suggested canal across the isthmus. Moreover, the long winter, the soil thawing hardly more than two feet in

depth during the summer, and the unnavigability of the two rivers, which swell rapidly, like mountain torrents, after every rainfall, and flow in such tortuous courses, seem to forbid the realization of the scheme. The portage between the Chuya and the Podarata was found to be forty-seven miles—much longer than had been estimated. The party reached Obdorsk on their return on the 19th of August, and finally quitted it *en route* for Europe on the 3rd of September.

A paper followed on "The Latest Exploring Expedition across Western Australia," by Mr. W. H. Tietkens. This was a narrative of Mr. Ernest Giles's perilous traverse of the immense desert interior of Western Australia from east to west in 1875, by the second in command of the expedition. The route followed was much to the south of the previous one of Forrest—from west to east—and was chiefly remarkable for the long intervals passed without finding water—in one instance upwards of 300 miles—and for the dense forests of acacia through which the party had to struggle during a great part of the way. The use of camels, furnished by the Hon. Thos. Elder, who met the whole expenses of the expedition, alone rendered such a journey practicable. The temperature generally varied from 32° to 96° Fahr. in the twenty-four hours. The scrub which clothes so great a part of this waterless region was composed of trees growing a little higher than a camel, the undergrowth consisting of that worst enemy of the Australian traveller, the spiny grass *Triodia irritans*, which excoriates the legs of the baggage animals, and strips the hair from their sides. The atmosphere in the scrub is stifling, like the breath of a furnace, and the flies, in dense swarms, annoy both man and beast. Night would be the most comfortable time for travelling; but the scrub is impracticable during darkness, and the search for water—the pressing necessity of which weighs upon the mind of the explorer—cannot be carried on in those hours. Thus, the march by day, with all its heat and suffering, is an inevitable necessity. The expedition consisted of three Europeans, four natives, with a train of eighteen camels and their drivers. It started from Youldeh (125 miles N.W. of Fowler's Bay) in July, and reached the first outlying stations of West Australia in November. With the exception of a limited tract near the commencement of the route, the whole country appeared to Mr. Tietkens as not adapted for permanent settlement, owing to the barren nature of the soil and the deficiency of water. The prevailing geological formation was red granite.

ECONOMIC SCIENCE AND STATISTICS.

(SECTION F.)

Among the subjects discussed in this Section, the first in point of breadth and importance, as well as in respect of the place given to it by the President in his instructive Address, was the thorny question of population, on which the last word will hardly be said a century hence. Lord Fortescue satisfactorily proved that the generalizations of Malthus were made without sufficient knowledge of the resources on which succeeding generations could count to provide subsistence for rapidly growing numbers. The early generalizations of every science ought to be regarded as only provisional, and, if they continue to pass for immutable laws, the fault lies not with those who are the first to bring the light of observation and speculation to bear on intricate phenomena, but with those among their successors who will not let in further light by the same process. The population question is one of several with respect to which economists are generally beginning to see that universal and unconditional theories are to be shunned, and that even within given limits of time and space something may be said on both sides, and, at best, only a rational and probable conclusion, not one of mathematical certainty, can be reached. If Malthus did not, and could not, in his age allow for the means of support which emigration, colonization, free trade, and mechanical invention would bring to the aid of the future population of the United Kingdom, the present reaction against his doctrine takes its colour in some degree from local and temporary conditions. India, surely, is over-populated in relation to the actual means of subsistence, and hundreds of thousands of Hindoos will probably have died of starvation before the next meeting of the British Association. The United States, too, have been latterly sending immigrants empty away, while not a single pound of beef or mutton arrived in Liverpool last week from that country. There is, again, in the United Kingdom a large part of the population living from hand to mouth, which, in several possible contingencies, would be without any means of subsistence other than charity, public or private, and therefore excessive in the Malthusian sense. Lord Fortescue did not quite fairly represent the Malthusian theory in saying that had it been accepted by the people of this country, the population, instead of amounting now to nearly thirty-two millions, would have remained as it was at the beginning of the century, when it was but sixteen millions. Malthus did not say that population ought to remain stationary, but only that it cannot long continue to advance at its maximum potential rate, which must, according to his doctrine, be checked either by prudence or by mortality. So stated, the proposition seems to have really been borne out, though not in the degree its author would have expected, by the actual rate of increase. Had it increased at the potential rate, it would now, instead of being under thirty-two millions, exceed 132,000,000, and by the end of the century it would reach 264,000,000. So that either the "preventive" or the "positive" check, or both, must have been in operation. Malthus, no doubt, had no conception of the quantity of corn which free trade would enable these islands to draw from the surrounding world, yet, on the other hand, he understated his own case in laying such exclusive stress upon corn. Man does not live as a civilized being by bread alone, and a population might be excessive in respect of the quality of its habitations, and the means of health and cleanliness, although amply provided with loaves of bread. It may, too, be questioned whether a rapid increase of population is the most powerful stimulus to production. Dear labour rather than cheap labour, as a matter of experience, has been the chief cause of invention. The greatest number of agricultural machines have come from America when labour was scarce and dear, and because it was so.

The main argument of an interesting paper, read by Mr. Stephen Bourne, rested on a classification, the propriety of which, although in accordance with the meaning put by several eminent economists on the unfortunate terms, "productive" and "unproductive," is questionable, quite apart from its bearing on the subject of over population. Mr. Bourne divides the population of the United Kingdom into 10,500,000 producers, and 21,000,000 non-producing consumers; excluding from the productive class not only 12,000,000 persons over sixty-five, or under fifteen years, as too old or too young to labour, but also 5,000,000 wives or women engaged in household duties, and 4,000,000 persons belonging to professional, domestic, or indefinite classes. Hence he argued that one third of the nation supports the other two thirds, so that population cannot be regarded as pressing upon the means of subsistence, when so large a fund of productive power remains in reserve. But the definition which excludes so vast a proportion of the nation from the class of producers is arbitrary and pedantic, though sanctioned by high authority. The wife, daughter, sister, or servant who makes, mends, and washes clothes, cooks food, and performs other kinds of domestic work, is simply doing within the house what tailors, milliners, bakers, and other tradespeople are doing outside, and is fully entitled to rank as a productive member of the community. National industry would soon come to a standstill if these domestic works were neglected. It is one of the fundamental defects of English treatises on political economy that they take no account of the family as one of the chief organizations of society for the production and distribution of wealth.

Some disparaging remarks were made in the Section with respect to the late Mr. Mill. The leading economic principles of that great writer were those that were accepted by the most eminent English economists of the generation in which he was brought up; and if he did not introduce all the corrections that were required, he at least set the example of admitting the necessity for much revision and limitation of received doctrines. With regard to the question whether the supply of water and gas, and other public works, ought to be in the hands of private companies, or administered by public authority, national or local, Mr. Mill would certainly have agreed with Lord Fortescue that a practical monopoly of a prime necessary of life or business cannot be brought within the principle of competition and individual interest. But the difficulty is not solved when a case has been made out for the interposition of government, central or local. No plan has yet been devised to overcome the niggardliness of rate-payers, and the supineness of local authorities, in relation to some of the most urgently needed sanitary improvements. And neither Parliament nor the central executive can do all the business which people cannot or will not do for themselves.

Both the papers and the discussions in the Section were, for the most part, instructive and interesting, and there was little wandering into regions over which its jurisdiction might be challenged. Yet there were cases—we may take as an example the subject of the assimilation of the laws of the three kingdoms, ably discussed by Dr. Hancock—where it was not obvious what was, in the mind of the reader or speaker, the connecting link of the group of subjects allocated to Section F, under the denomination of Economic Science and Statistics. Few persons, probably, attending the Section have considered the question whether the first term, "economic," qualifies both the terms "science" and "statistics," or whether statistics is an independent term. In the first case, only pure questions of economics and economic statistics would be admissible within the Section. In the second, the inquiry follows, what is the province of statistics? That this inquiry is no easy one, appears from the fact that the eminent German statist, Dr. Engel, found one hundred and eighty definitions of the word in different works, although nearly all had some reference to its derivation, and assumed that it treats of the phenomena of States or political societies. It must be difficult to regulate the admission of papers and topics of discussion in the Section so long as its province is undetermined by something like definite boundaries.

MECHANICAL SCIENCE.

(SECTION G.)

The business of the Section commenced, so to speak, with an adjournment of an hour and a half, to give the members an opportunity of hearing the opening addresses in some of the other Sections. In compliance with a desire frequently expressed, arrangements were made this year for the Presidents' addresses in the various Sections to be delivered at different times in lieu of all being given on the first day and at the same hour. The address of the President of this Section having been arranged for delivery the second morning of the meeting instead of the first, the adjournment as above was a suitable consequence.

On reassembling, the President, Mr. Edward Woods, called on Mr. W. Barlow to read the Report of the Steel Committee. This Committee was appointed at a former meeting of the Association, when Mr. Barlow presided over this Section, and its object was to facilitate the use of steel in railway and other constructions, and, for this purpose to lay down the conditions on which its use might be sanctioned by the Board of Trade, especially in reference to the former. The Committee, consisting of Mr. Barlow, Sir John Hawkshaw, and Col. Yolland, arrived at the conclusion, and

recommended for adoption of the Board of Trade, that the conditions for the use should be, first, that it should be cast or produced by some process of fusion, and duly hammered or rolled, and, secondly, that the strain on any part of the structure, including the weight of the material, should not exceed six and a half tons on the square inch. This recommendation is under consideration of the Board of Trade, and it is expected it will be adopted. In the mean time, the Committee will be reappointed to continue its communications with the Board of Trade.

Capt. Douglas Galton then proceeded to lay before the Section a paper descriptive of the works now being executed by Mr. James Eads, an American engineer, for improving the navigation of one of the mouths of the Mississippi, which he (Capt. Galton) had had an opportunity of inspecting whilst in America last year. In former years the trade of New Orleans was a large and increasing one, but the gradual introduction into commerce of a class of vessels too large to cross the bars at the mouths of the passes of the Mississippi tended to divert trade to the Atlantic seaports. Moreover, the war of secession interposed a sudden check to commercial intercourse between the North-Western States and New Orleans. When, however, after the war, the trade between the Northern and Southern States began to revive, the necessity of improving the access from the sea to New Orleans was urged upon the American Government. The works designed by Mr. Eads were commenced in June, 1875, and their object was to concentrate the increased flow of water in the south pass, as well as across the shoal bars at each end (1), by means of lines of jetties, funnel-shaped, at the head of the pass, and parallel at its lower end; (2) by closing the Grand Bayou, which diverted a portion of the water after it had entered the south pass, and prevented its reaching the lower end; and (3) by regulating the proportion of water to be admitted into the Pass à Loutre and the south-west pass. The principle was to allow nature gradually to excavate the channel in the line laid out for it. This had been effected by the use of fascines combined into what were termed in engineering language mattresses, laid down at certain parts so as to cause a scouring out or deepening of the channels. That good results had already been achieved was proved by the fact that, in April last, vessels of twenty-two feet draught went through the south pass to New Orleans; and as this city was the nearest port of importance for the rich districts of Illinois, as well as for Missouri, Arkansas, and Texas, there could be little doubt that a great future was in store for it.

Mr. Barlow, Mr. Taylor, Mr. Shoolbred, and Mr. E. Easton bore testimony to the valuable use of fascines for like purposes on the Danube, the coast of Holland, in Spain, and in reclamation works in the fens of this country.

Mr. Barlow, in a short paper, entitled the 'Upward Jets of the Niagara,' stated that, in visiting the Falls last year, he noticed that, unless the doors and windows of the hotel were tightly closed, they were subjected to a jarring movement, the impulses of which varied in time and degree. Through the mist which always enveloped the lower part of the Falls themselves, jets of water appeared suddenly projected upwards, frequently rising from ten to thirty feet above the upper level. This phenomenon occurred at varying intervals, and the jets seemed to somewhat resemble a pine-tree in form. Going underneath the Falls, and looking at and through them, it became apparent that as the water broke up during its descent, air in large quantities got between it and the rocks and became enclosed. Falling in that state, with the velocity due to a height of 150 or 160 feet, the contained air would become suddenly and violently compressed on striking the rocks below. The compressed air would burst through the thinnest layer of the surrounding water, causing a species of explosion, and carrying a portion of the water upwards with it. The supposition most consistent with the observed phenomenon appeared, therefore, to be that the jets of water and the jarring action on the doors and windows of the hotel were both due to the explosions, or sudden expansions, of air compressed by the falling of the water in the manner described.

Mr. G. D. Bellamy then gave the Section a highly interesting paper descriptive of the Plymouth Waterworks. The credit of the great work of bringing a stream from the River Mew into Plymouth had been uniformly ascribed to Sir Francis Drake, who in 1581, occupied the position of Mayor of the borough. Other familiar names in connexion with the undertaking were those of the Coplestons of Warleigh, the Elfords of Sheepstor, and the Trelawnys, of Badshead, now St. Budeaux. In 1585 the Corporation obtained the Act under which the town had ever since been supplied with water. The plan adopted in laying out the course was simply to lead the water where it would contour the hillside, and thus the distance became nearly doubled. Public conduits were built in various parts of the town, from which the people drew water freely, but supplies were taken into the residences of some of the inhabitants who paid for them. In 1822 considerable improvements were effected. Allowing, however, for the alterations which time had rendered necessary, the same system prevailed now as when the works were first devised. The stream continued to be taken from the River Mew, at the head-weir near Sheepstor, and was conveyed in an open channel for a distance of twelve miles. Then it reached the village of Knackersknowle, where it was received into the first distributing reservoir, containing about one million gallons. From thence it was transmitted, by means of iron pipes, to Hartley, where, at an elevation of 300 feet above the sea, there was a second distributing reservoir capable of holding eight million gallons. This reservoir was the main distributing source for the entire town and suburbs, and it also supplied the two town reservoirs at Drake's Place, as well as a smaller one in the North Road, used for the Admiralty establishments and the Victualling Yard. The area of the watershed drained by the river at the head-weir was between 4,000 and 5,000 acres, the greater portion of which was uncultivated moorland, and some parts of which rose to an elevation of over 1,300 feet. The rainfall, averaging as it did over fifty-five inches per annum, afforded a copious supply of water at almost all seasons. The quality of the water was remarkably pure and soft, on account of the natural filtration to which it was subjected from the character of the land, which was entirely granite formation, and in the valleys was granite *débris*. The fluctuations in the stream, as in all mountain watersheds, were very considerable. These irregularities had forced the Corporation to consider the necessity of increasing the storage, which, having regard to the growth of the town, was becoming more and more pressing every day.

In reply to questions, Mr. Bellamy stated that the supply was constant and at a pressure of about forty pounds per inch, the domestic supply did not exceed twenty-five gallons per head per day, which was admitted to be large, and that doubtless considerable waste existed. The amount formerly rose as high as sixty gallons per head, so that a considerable reduction had already been made. Remarks were made on the very inadequate amount of storage.

On Friday the proceedings commenced with the President's address, who took for his theme a subject which at the present time is looked upon with the greatest interest both by the public as well as by engineers, viz., "Railway Breaks." He said that the provision of adequate break power to control trains had latterly much engaged the attention of railway companies and of the Government. In the summer of 1874, a Royal Commission was appointed to inquire into the causes of accidents on railways, and the possibility of removing them by further legislation. One branch of the inquiry naturally led to the consideration of accidents caused by collision; and it appeared from the evidence taken before the Commissioners that trains were generally provided with insufficient controlling power, and that the distance within which, when running at high speed, they could be stopped by the break ordinarily in use had not been ascertained with any approach to accuracy. It was under these circumstances that the Commissioners applied to the railway companies to institute a definite series of experiments to test the value of hand breaks, and the effect of various systems of continuous breaks. In conjunction with Colonel Inglis, R.E., he, the President, was entrusted by the Commissioners with the supervision of the experiments, to the satisfactory conduct of which the railway companies contributed in the most liberal manner. With few exceptions, and up to a comparatively recent period, the companies had remained content with the break appliances which were common forty years ago. These, no doubt, were sufficient to control the trains in those early days, few as they were in number, and limited in weight and speed. The breaks were applied separately, and by hand power, always to the tender, and usually to some few of the carriages and to the guard's van or vans, if such accompanied the train. As long ago as 1858, the Board of Trade called the special attention of the railway companies to the fact that the amount of break power then habitually applied was insufficient to prevent frequent accidents occurring from collisions, many of which they considered might be averted. Particular reference was made to two systems which had come into daily use on the East Lancashire and the Lancashire and Yorkshire railways, namely, the breaks of Newall and of Fay, by means of which trains of ninety to one hundred tons weight, running at high speed, could be effectually controlled by driver or guard, even when proceeding down steep inclines, and brought up within a moderate distance. It was certainly matter for surprise, seeing the advantage of continuous breaks, that the railway companies generally should have so long tolerated the old system, and been so slow to adopt a method which, instead of being dependent for its due action on the attention of several persons, could effectually be placed under the control of one. This lethargy prevailed, too, throughout a period when increased speed had come to be demanded, when augmenting traffic required heavier trains, and when, consequently, more ponderous and powerful engines had to be used—circumstances which ought to have induced the companies to effect simultaneously a readjustment of their break appliances. The continuous breaks of Newall and Fay simply involved a wider distribution of power over the different vehicles of the train, and gave the means of applying that power by one, or, at most, two, attendants. It was in that direction that the ingenuity of inventors had recently been turned, and there were now several systems of continuous breaks in successful working on the leading railways, each claiming some special advantages over its rivals, whether as more simple in construction, less expensive in application, or effecting more complete control of the train. The Royal Commissioners desired that attention should be primarily directed to the following points:—(1) The distances within which trains running at various speeds could be stopped by the system of breaks in ordinary use on the different lines of the United Kingdom; (2) what results could be obtained by the additional application of break power; and (3) how far a very large amount of break power could be suddenly resorted to with safety in heavy trains running at high speeds. For the purpose of the experiments a portion of the Nottingham and Lincoln branch of the Midland Railway was selected, as offering a piece of line comparatively level and free from any sharp curves. Six companies furnished eight complete trains, which represented as many systems of continuous breaks comprehended in four classes, namely, (1) Clarke and Webb's and Fay's breaks, applied by ordinary mechanical gear; (2) Smith's and Westinghouse's vacuum breaks, actuated by atmospheric pressure produced by exhaustion of air; (3) Westinghouse's and Steel M'Innes's air breaks; and (4) Clarke's and Barker's hydraulic breaks. The experiments extended over a week,

and comprised several series. It was demonstrated that the friction of a complete train, in which the weight of the engine and tender constituted, say, one-fourth of the gross weight, inclusive of the atmospheric resistance it encountered in its course, was 42·100ths per cent., or about 9½lb. per ton. This result confirmed what long experience had led them to anticipate. It was discovered further that, on a level line, a train running at the rate of forty-five miles an hour could be stopped by hand breaks only within 1,000 yards, or, if at the rate of sixty miles, within 1,700 yards. The necessity for some greater control over fast passenger trains was thus rendered obvious. The trials proved, in a very striking manner, the great advantage of continuous breaks, for even in their least effective form they afforded more than double the stopping power of the usual hand breaks, whilst in their most effective form the power was quadrupled. He, the President, was of opinion that no system could be considered satisfactory which did not produce a retarding power of at least 8 to 10 per cent. of the entire weight of the train; in other words, a power by which fast trains could be stopped in from one-third to one-fourth less time than at present. Obviously the stopping distance was primarily influenced by two considerations:—(1) The length of the interval which elapsed between the break being put into operation and its taking an effective grip on the wheels; and (2) the amount of pressure brought to bear on each wheel, and the constancy or otherwise of the action after the blocks had gripped the wheels. The unpleasant sensation often experienced during quick stoppages was produced by intermittent and fitful action. After the breaks had been made to bite the wheels their hold became relaxed, a slip took place, followed by successive bites and slips, the latter giving rise to sudden accelerations of speed. The action of a perfect break should exactly resemble that which gravity would cause if an ascending incline of uniform gradient could be suddenly placed in front of the train to prevent its motion. Under such conditions no inconvenience or danger need be apprehended from the stoppage being accomplished within even a shorter distance than any that was effected during the experiments. A valuable addition of power under the immediate control of the driver, would be afforded by the fitting of breaks to the engine, and he was glad to find that the recommendation of the Royal Commissioners in this respect had met with prompt attention at the hands of the railway companies. The question of the best material for break blocks had of late received a good deal of consideration, and it would seem that cast-iron, and even steel, was fast superseding wood. It generally happened that wheels did not become skidded until the speed of the train had been materially reduced. It seemed desirable, therefore, that for ordinary stops the break pressure should be applied so as to act just short of skidding the wheels, the full skidding power being only used in cases of imminent danger. The general adoption of an effective system of continuous breaks on carriages which had to run from one line to another would be productive of much advantage, for then, in breaking-up and re-making a train at any junction station, the carriages would be found ready-fitted with the requisite appliances for working. If allied companies could only agree to adopt the same system, break improvements would proceed with far greater rapidity than at present, and public convenience and safety would thereby be promoted. The time had arrived not only when each system should be scrutinized and tested in the most complete manner, but when the companies should clearly set before themselves the conditions which a good continuous break ought to supply. A study of the different methods which came under his (the President's) notice during the experiments pointed to the following considerations as necessary in view of the provision of perfect break power for heavy fast trains:—(1) The break power should be applied to all the wheels of all the vehicles throughout the train. (2) The power by which the blocks were forced upon the wheels should be adequate for skidding the wheels on the speed becoming moderately reduced. (3) The driver should have the whole of the break power completely under his command, and be able to apply it at a moment's notice, as he was the first person likely to discover any obstruction ahead, and was primarily responsible for the regard of the danger signals. He could thus stop the train at once, and no time would be lost by his having to signal danger to the guard. (4) The guards should individually possess the like means of applying the continuous break, so that they might be able to stop the train without reference to the driver, on an emergency which might manifest itself to them but not to him, such, for instance, as a broken axle, or a carriage getting off the line. (5) The power in hand should be so susceptible of modification that the driver should be able to apply a moderate amount only for effecting ordinary stops, while he kept in reserve a proper excess to be used only on emergencies, or on slippery rails. (6) Full break application should not require more than a very moderate effort on the part of either driver or guard. (7) The pressure should be steady, and distributed as equally as possible over all the wheels, and, with the intervention of some elastic medium, should act upon the wheels in such a way as to prevent too sudden stopping or the snapping of chains, which produced discomfort and inconvenience to the public. (8) The machinery should be of simple construction, not likely soon to get out of order, and admitting of being easily repaired. (9) Indication should be constantly afforded to driver and guards that the breaks were in proper condition to work or otherwise. (10) The power of working the tender breaks and the van breaks by hand might be advantageously retained. (11) The breaks should be self-acting in case of the severance of the train. (12) Automatic action being provided, means should be furnished the break attendants for modifying that action instantaneously, according to the circumstances in which the train might be placed after an accident. (13) It would be dangerous, and therefore unadvisable, to give to passengers any power over the breaks. Such seemed to be the principal conditions necessary for realizing the conception of a perfect break—a break which would constitute an invaluable instrument in contingencies of almost daily occurrence at some place or another in the great railway network of the country.

Sir William Thomson then described his method of sounding from a ship at full speed. The method consisted in the adoption of pianoforte wire in lieu of the old sounding line, as detailed at a previous meeting of the Association. Experience had shown the great superiority of this method, and it was making its way gradually into use. He expressed his regret that it had not been adopted in the Challenger Expedition, as by its means both time and money would have been saved, and a very much larger number of soundings could have been taken. To this wire, at a given distance above the lead sinker, a glass tube, open below, but closed above, the interior of which was coated with a mixture of red prussiate of potash and starch, was affixed, enclosed in a tube of brass partially filled with a solution of sulphate of iron, into which the open end of the glass tube dipped. The pressure of the water as the apparatus descended drove the sulphate of iron up the glass tube, converting the prussiate of potash into a film of Prussian blue as it ascended, thus marking the height due to the depth of descent, and, by means of a scale applied on its return to the surface, the depth of the sounding could readily be ascertained.

Numerous experiments tried on board the White Star line of steamers, running from Liverpool to New York and elsewhere, have proved thoroughly the practicability and accuracy of the method. The pianoforte wire used weighed fourteen pounds to the mile, and was capable of bearing a strain of 220 pounds, or about eighteen miles of its own length. Sir William Thomson then described his improved mariner's compass, with correctors for iron ships.

Prof. Osborne Reynolds read a paper 'On Compound Centrifugal Pumps and Turbines.' After pointing out that at present centrifugal pumps are seldom used to raise water more than fifteen or twenty feet, and that this was on account of the inadequacy of the results obtained at higher lifts, the author proceeded to say that the theory of these pumps, as it was at present understood, showed no reason why the water to be raised might not be passed through a succession of similar centrifugal pumps one after the other, receiving from each a lift of say fifteen feet, the pumps being for convenience arranged on the same spindle. It was a matter of surprise that no such compound system of pumps was used; for although, perhaps, the result was not obvious, yet, considering how much attention had been devoted to the subject, it could hardly have passed unnoticed. This, however, was in some degree explained by the discovery that Mr. Gwynn had years ago tried such a system, and failed to obtain a satisfactory result. As there appeared to be no essential reason for this failure, the author had examined Mr. Gwynn's manner of carrying out the principle, and, having satisfied himself that the failure was due to the imperfect manner of compounding the pumps, he had had a set of four pumps constructed, as well as a single pump, of exactly similar construction, and he found that the compound pumps, while giving in every other respect as good, or rather better, results than the single pump, had raised the water to exactly four times the height. When working under the most advantageous circumstances, these pumps gave an efficiency of about 65 per cent., as high as that obtained by any centrifugal pumps in use. It was then pointed out that the same combination might be usefully employed for turbines using water from a great height. The author then proceeded to describe certain "dynamometers, for measuring the torsion in a shaft." The first of these was a water-break used for measuring the work done by a turbine. The break consisted of a centrifugal pump fastened on the shaft, the case being also suspended on the shaft; it depended on the twisting of a spring enclosed in a case, the two ends of which screwed into one another, so that as the spring twisted the ends approached, their distance apart being measured by a simple system of levers registering the torsion in the spring. The most interesting point of this instrument was the way in which the tremor caused by rapid motion prevented all frictional resistance in the screw, which, although considerable when at rest, was not perceivable when the shaft was turning, and kept from turning by weights on levers, which exactly measured the torsion on the shaft; the feed-pipe to and rising main from the pump communicated by a valve, so that the water was used over and over again, and, by opening the valve, the resistance of the pump might be varied to any required degree. The break shown was only three inches in diameter, but with this fifteen horse power could be measured when the spindle made 6,000 revolutions per minute. The other dynamometer was for measuring the work transmitted by the shaft to the pump.

Mr. Margary read a paper on the construction of Brunel's great Saltash Bridge, and, under his guidance, at the close of the meeting, a large party had the opportunity of inspecting the bridge in all its interesting details.

Mr. Baldwin Latham showed how, by a simple and inexpensive contrivance, he had succeeded in intercepting the rainfall from the sewers constructed by him at Longton, where a condition was made by the Duke of Sutherland, who took the sewage, that the rainfall should, as far as possible, be excluded. It consisted of an arrangement by which, when the flow from the rainfall was increased, its velocity caused it to leap over the sill, and fall beyond the sewer into the channel specially constructed to carry it away. It was found to be successful in every respect.

Mr. Latham then gave a very lucid and valuable description, illustrated by elaborate diagrams, of his researches in reference to the deep ground flow of waters in the chalk formation.

On Saturday the Section did not meet.

BRITISH ASSOCIATION NOTES.

Mr. W. Spottiswoode has been nominated President-elect for the next meeting of the British Association, which will be held in Dublin in August, 1878.

It has been decided that, in 1879, the Association shall visit Nottingham, and there seems to be a desire to meet the following year in Swansea. The Association was established at York in 1831, and it is proposed that the fiftieth anniversary shall be celebrated at York, whence a cordial invitation has already been received.

One of the most interesting objects exhibited at the late meeting was the telephone. It was not only described before one of the Sections, but it formed the main subject of Mr. Preece's discourse to the working men of Plymouth, whilst at soirées and other meetings the wires were conspicuous objects, and the great amusement of the people seemed to consist in talking with their friends through this novel medium.

The famous "Red Lion" dinner, at which a select party of the philosophers may be seen at play, was this year under the presidency of Mr. Bramwell, the engineer. Much amusement was caused by burlesques on the telephone, the Colorado beetle, and other scientific novelties.

On the whole, it can hardly be said that the Plymouth meeting was marked by great success. The number of tickets sold was not equal to what might have been expected, and many of our scientific magnates were conspicuous by their absence.

GEOGRAPHICAL NOTES.

Mr. Stanford sends us a translation, by A. M. H., of Herr M. Caviezel's 'Guide to the Upper Engadine.' Herr Caviezel is a "Lehrer" at Pontresina, and accordingly has the double qualification for a writer of a guide-book of being at once intimately acquainted with the district about which he writes and sufficiently educated to know how to impart his information. The book is rather a guide for the ordinary tourist than for the mountaineer, and therefore not likely to supplant Mr. Ball's well-known work. At the same time, the mountaineer who is anything more than a mere gymnast, and cares to know something of the natural and other history of the country through which he goes, will find this a useful companion. We could have dispensed with a certain amount of "fine" writing, to which the German language lends itself more readily than the English, but authors are apt to think more of the ornamental than of the useful parts of their works, and the translator probably had no choice. As far as the style of the translation goes, we may say that, but for a chance expression here and there, showing a want of familiarity with mountain technicalities, it would be hard to detect that the book was not originally written in English. Perhaps the most useful thing in the volume is the careful classification of the hotels at each place, in which is given (what English guide-books are apt to omit) some idea of the cost of living at each establishment. We may add that recent experience has enabled us in many cases to verify Herr Caviezel's accuracy, and we can fully recommend his book to intending visitors to the Engadine. Guides' charges in that district are monstrous.

We have just seen a manuscript map of Japan compiled by Mr. Knipping, one of the officers attached to the Japanese Survey Department. This map is superior in every respect to the one recently noticed in our columns, and we hope to see it soon published. The proposed trigonometrical survey of Japan is not to be proceeded with, and the survey of the environs of Tokio, Kioto, and Osaka is being completed by Japanese, the European staff having been discharged.

In the forthcoming number of Petermann's *Mittheilungen* will be published Kanitz's map of Danubian Bulgaria and the Balkans, which is the result of fifteen years' explorations, and, together with the three bulky volumes of travels, constitutes one of the most valuable contributions to the geography of the Balkan peninsula. Kanitz's works should be very carefully studied by every one desirous of obtaining trustworthy information on the condition of Bulgaria such as it was previous to the Russian invasion. The execution of the map in photo-zincography, we regret to say, leaves very much to be desired. The names are frequently quite illegible, and this is all the worse, as Herr Kanitz has adopted a system of spelling involving the use of many diacritical signs.

M. Ch. de Ujfalvy, who is travelling in Russian Turkestan on behalf of the French Ministry of Education, has arrived at the conclusion that Tajiks and Galcha differ essentially. He says that the latter, as well as the inhabitants of Karategin, Darwaz, Shighnan, and Badakhshan, are the aborigines of Transoxania, and belong to one of the most ancient branches of the Aryans, who formerly extended eastward as far as Khotan.

Science Gossip.

News has arrived from America of the discovery of a new small planet by Prof. Watson, of the Ann Arbor Observatory, Michigan. As it was found on the 8th inst., it will reckon as No. 174, whilst M. Borelly's discovery on the 11th, which we announced last week, becomes No. 175 on the list. Prof. Watson's discoveries of this kind now amount to twenty in number, the first being Eurynome in September, 1863.

More interesting intelligence has recently been telegraphed across the Atlantic—that of the discovery of two satellites of the planet Mars, hitherto supposed to be moonless. These small bodies appear, however, to have at last revealed themselves to Prof. Hall with the splendid refractor of 26 inches aperture, at the Washington Observatory; and his telegram, necessarily brief, states that he has approximately determined their periods of revolution round Mars at fifteen and thirty hours respectively, at the distances of about 8,600 and 13,800 from the planet's centre.

The Chair of Chemistry and Physics, so long occupied by Dr. Noad at St. George's Hospital, is filled by the appointment of Prof. Wanklyn.

We have received the Annual Report of the Department of Mines of New South Wales for 1876. We find from it that the total amount of gold obtained in that year was 153,531·48 ounces, a decrease on the year 1875 of 73,454 ounces.

FINE ARTS

DORÉ'S GREAT WORKS, 'The BRAZEN SERPENT,' 'CHRIST LEAVING the PRÆTORIUM,' and 'CHRIST ENTERING JERUSALEM' (the latter just completed), each 37 by 29 feet, with 'Dream of Pilate's Wife,' 'Christian Martyrs,' 'Night of the Crucifixion,' 'House of Caiaphas,' &c., at the DORÉ GALLERY, 35, New Bond Street. Daily, Ten to Six.—1s.

ROMAN REMAINS AT HEIDELBERG.

Since the date of my last letter (*Athenæum*, No. 2592), the excavacations at Heidelberg have brought to light four more pottery furnaces and nine basements of houses similar in character and dimensions to those already described. Besides these, the workmen have come upon a great number of circular pits, about two mètres in depth, all of them filled with fragments of pottery and rubbish of various kinds. The sides of these pits, though not lined with any kind of masonry, are sharp and smooth, the clay soil having almost the firmness of solid rock; what the pits were intended for is still uncertain. The most probable conjecture seems to be, that they were receptacles for food, like the similar walled pit or dry well in one of the houses (*Athen. l. c.* p. 838, col. 2). In that case it is likely that they were in the inside of dwellings of an inferior kind, constructed of wood and mud walls, of which no traces are left. This is the more likely, as they are found at regular intervals and in parallel lines, just as if the houses to which they belonged had formed streets.

The most interesting and important discovery hitherto made is that of not less than seven Roman milestones, which were all found in one of the basements lately opened. They seem to have been thrown there by the German peasants, who, after the expulsion of the Romans, cleared the land for the purpose of cultivation. Their original site may be conjectured to have been a square area, about two mètres each way, situated close by, at the intersection of the principal road to Spires and a narrower cross-road. This spot still shows the remnant of a pavement or stone flooring, and may have been surrounded by a wall, into which the milestones were let. They are all cylindrical, averaging 1·50 mètre in height above ground, and 0·50 mètre in diameter; the front, which bears the inscription, is smooth, and the back, which possibly was let into a wall, is quite rough. I will now give the inscriptions in chronological order.

No. 1

IMP. CAES
DIVI . SEVERI . NEPOTI
DIVI . ANTONINI
MAGNI . FILIO . MARCO
AVR. . . . . PIO
FELICI . AVG. PONTIFICI
MAX. TRI. POTEST. ITER.
COS. III. P.P. PROCOS
C.V.S.N. DEVOTISSIMA
POSIT. A. LOP. L. IIII.

i.e., "Imperatori Cæsari | Divi Severi nepoti | Divi Antonini | Magni filio, Marco | Aurelio . . . . Pio | Felici Augusto pontifici | maximo tribuniciæ potestatis iterum | consuli tertium patri patriæ proconsuli | civitas Ulpia Severiana Nemetum devotissima | posuit. A Lopoduno leugæ quatuor."

This stone, as appears from the inscription, served two purposes. It was a milestone, showing the distance from Lopodunum, and it was, at the same time, a stone erected in honour of the reigning emperor. This emperor, called Marcus Aurelius Antoninus Pius, is better known in history as the infamous Elagabalus (reigned 218–222. See Gibbon, 'Decline and Fall,' i. chap. 6), and his reputed father, here called Divus Antoninus Magnus, was the terrible Caracalla, the degenerate son of Septimius Severus. The venerated name of Antoninus had been adopted by Elagabalus, who really had no claim to it. After his murder it was, by a decree of the Senate, erased from all public documents. It is interesting to see that this order was executed even in the distant Roman settlement on the Neckar, and that a stonemason was set to work to obliterate the name on our milestone. The work, however, was done somewhat imperfectly, so that traces of Antonino are still visible in the gap between AVR and PIO (line 5).

The stone was erected by a community of Roman settlers, which was called Civitas Ulpia Severiana Nemetum (C. V. S. N.). It was the Emperor Ulpius Trajanus who, according to Eutropius, 8, 2, restored the Roman settlements on the right bank of the Rhine, and we know from Ammianus Marcellinus, 17, 1, that Trajanus gave his name to a fort in the land of the Alamanni. This name, taken from that of the gens of Trajan, was Ulpia, as in the case of the basilica Ulpia in Rome. The Civitas Ulpia is now identified with the Roman settlement on the Neckar, the centre of which was Ladenburg, half-way between Heidelberg and Mannheim. In Ladenburg a stone was found in 1848, unfortunately much broken, but containing very distinctly the letters "Civit. Ulp. S." This was apparently the stone marking the spot from which the distances were measured. The letter S., which follows in both inscriptions, is to be read Severiana or Septimia, for it appears that Septimius Severus conferred additional benefits on the Civitas Ulpia, and that this name was added to that of Trajan. The last letter, N, is evidently the abbreviation of Nemetum. The whole district was originally inhabited by the Nemetes, and Spires, the capital of it, was

called Colonia Nemetum. The Rhine divided the district into two parts. The eastern part was a distinct civitas, with Ladenburg for its centre. This town of Ladenburg on the Neckar was long supposed to be identical with the Lopodunum of the Romans, named in Ausoninus ('Mosella,' 421), because the mediæval name, Lobodenburg, Lobdenburg, seemed to point to the Latin designation. But direct proofs were wanting until, just ten years ago, eleven huge stones were dug out in a field outside the town, which contain the name LOPODVN and VIC. LOP (twice), leaving no doubt about the fact (see Stark, 'Jahrbuch f. Alterth. d. Rheinlande,' vol. 44).

An additional confirmation is now contained in the milestone discovered in Heidelberg, in which the distance of the locality is quite correctly stated to be four leugæ from Ladenburg (A. LOP. L. IIII.).

It will be observed that the distance is not given in Roman miles, but in leugæ (leagues), according to the constant practice of the Romans, who adopted the measurements of leagues in Gaul, north of Lyons, as stated by Ammianus, 15, 11, "Qui locus (Lugdunum) exordium est Galliarum, exindeque non millenis passibus sed leugis itenera metiuntur."

No. 2 is dedicated to Alexander Severus (reigned 222–235)—

IMP. CAES
MARCO
AVRELIO
SEVERO
ALEXANDRO
PIO. FELICI
AVG.
C. S. N.
A. LOP. L. IIII.

Alexander Severus, though pressed by the Senate, refused to take the name of Antoninus, so much disgraced by his cousin and predecessor (Gibbon, chap. 6). Accordingly, this name does not appear in the inscription.

No. 3 is broken into several parts, and much injured. But it is clear that it was dedicated to Gordianus, who reigned from 238 to 244. The upper part is gone. Then follows—

. . . . RD . . . . O.I
P.F. AVG. P.M.
TRIB. P.P.P.C.S.N.
L. III.

i.e., Gordiano invicto | Pio Felici Augusto pontifici maximo | tribuno plebis patri patriæ civitas Severiana Nemetum | Leugæ quatuor.

The distance, four leagues, is the same, but the name of Lopodunum, from which it is measured, is omitted, as also in Nos. 4, 5, and 6.

No. 4 is in honour of the emperor Philip (reigned 244–249) and his son, on whom the title of Cæsar was conferred :—

IMP. CAES. M.
IVL. PHILIPPO
PIO. F. AVG. T.P
III. COS. ET. M.
IVL. PHILIPPO
NOB. CAES.
C. S. N.
L. IIII.

No. 5 is in honour of the Emperor Decius (reigned 249–251), whose full name was C. Messius Quintus Trajanus Decius :—

IMP. CAES
C. MESSIO
QVINTO
TRAIANO
DECIO. P.F.
INVICTO. AVG.
P.M.T.P.P.P. PROCOS
C S.N.L.IIII.

No. 6 belongs to the same reign, but is dedicated to the son of Decius, who occupied the rank of Cæsar, and whose full name is apparent from the inscription :—

Q. HERENNIO
ETRVSCO
MESSIO DECIO
NOBILISIMO
CAESAI
C.S.N.L.IIII.

The stonemason's errors in lines 4 and 5 are of no moment.

No. 7 is the last in order of time, and belongs to the joint reign of Valerianus and his son, Gallienus (253–259), to both of whom it is dedicated :—

IMPP. CAE
SS. P. LICIN
IO. VALER
IANO. P.F.
INVICTO
AVG. ET. P. LI
CINIO. GALI
ENO. AVG. CI
VIT. VLP. S N.
A LOP. LEVG.
III.

This is the only inscription which has more than the mere initials of the Civitas Ulpia, and it shows, if there were any doubt, what the letters C. V. of the other inscriptions stand for.

The fact that so many milestones were put up at the same place in such a comparatively short space of time needs explanation. The primary object of marking the distance from a geographical centre would be amply secured by one stone. It does not seem a satisfactory explanation to say that the stones were simply erected in honour of the respective sovereigns. If we glance over the troubled period from 220 to 259, we find that, in a marked contrast to the happy age which preceded, there was a rapid succession of usurpers and military adventurers, who had to struggle and fight for their titles. Now it seems not unlikely that, whereas in the capital the acquiescence and approval of the Senate sanctioned the title of each successive sovereign, in the provinces, and especially at military stations, the same object was attained by a public notice at a place where it was sure to be seen by many persons.

It was, indeed, no bad device to inform the perplexed provincials in this way who their master was, and the erection of such a public monument served as a kind of recognition of his title on the part of his subjects, especially of the legions stationed along the vast extent of the frontiers.

W. IHNE.

THE RUSSIAN ARCHÆOLOGICAL COMMISSION.

THE receipt from St. Petersburg of the *Compte Rendu* for 1874 of the Imperial Archæological Commission diverts the thoughts agreeably from conflicts which we are left to hope with what confidence we may will advance civilization ultimately. In the mean time, if laws, as usual, are reduced to silence amidst the din of war, it is much, indeed, if literature can gain a hearing. This publication, which issues from the press of the Imperial Academy of Sciences, leaves nothing in respect of typography and paper, and even in respect of the engraving of the illustrations on large scale leaves comparatively little, to be desired.

The official Report, which occupies twenty-four pages of Introduction, is written in French, and details the results of excavations executed during 1874 in the neighbourhood of Kertch, at the entrance to the Sea of Azof, and in the adjacent peninsula of Taman. On the whole, these were but moderately productive of objects of particular interest. The number of tombs explored was very large, and the objects recovered both abundant and varied, but few or none were distinguished by significance or novelty. All pertained to the Greeks or Hellenized population of the kingdoms of the Bosphorus, which commenced so early and retained independence so long. In some were found dated coins of Sauromates II. and Cotys II.; and elsewhere, with a coin of the Roman Emperor Maximian, another of Thotorses, who was King of Bosphorus A.D. 295.

How miscellaneous were the contents of the tombs, besides remains of skeletons and sometimes of wooden coffers or sarcophagi, may appear from this enumeration: vases plain and painted, simple earthen pots, glass vessels, statuettes in terra-cotta, rings, buckles, fibulæ, bronze mirrors, round and square, coins of Panticapæum, beads of lignite, cornaline, chalcedony, white and coloured glass, and vitreous material, iron swords, small ornaments of gold and silver, and the usual funereal ornaments in gold leaf. The last lines in the volume mention the discovery, in the tomb of a warrior as ancient as the fifth century B.C., of a well-preserved cuirass, or, at least, a large portion of one, formed of long square iron scales sewn upon leather. This, however, was a quite recent acquisition.

In fact, the principal harvest of the year 1874 was of that rather over-abundant class of mere antiquarian curiosities, from which nothing is to be gathered to throw new light on history or manners, or that is to be valued on its own account as work of intelligence and refined art. The indifferent success of one season amounts, however, after all, only to comparative disappointment, and enough has been recovered in former years to make any degree of success a very probable result of perseverance at any time. Unfortunately, the present excavators are, in numerous instances, not the first comers. On this subject the Report has the following observation :—"The results of the excavations by the Commission in 1874, near Sennaia, have given new confirmation to what has been noticed before, that those tombs which, by care in construction, encouraged a hope that they might contain valuable objects, proved to have been already plundered with surprising cleverness. In fact, the direction of the tunnels driven by the pillagers exhibited such proof of circumstantial knowledge, that the thieves were evidently either contemporaries of the dead, or of a time very little later; and having perfect knowledge of the position of interments and of the contents of the graves, did not disturb tombs which contained nothing but common objects in terra-cotta, glass, bronze, and iron."

The Report concludes with the statement that the cost for the year of the Commission, of the Museum of Kertch, the excavations, the purchase of accidental *trouvailles*, and the publication of the *Compte Rendu*, amounted in 1874 to 26,965 roubles 27½ copecks (say 3,500*l.*). The cost of acquiring the important numismatic cabinet of the Khanate of Khiva, of which the acquisition is duly registered, very naturally does not come into this account.

Prof. Ludolf Stephani supplies, in German, the usual "Supplements" of the Report. The first of these treats of miscellaneous objects obtained in 1873; the second and more interesting illustrates the designs of various vases in the Hermitage collection and elsewhere, which are not the produce of the soil of South Russia, reproduced in the atlas of plates of noble size. All these dissertations are accompanied by a wealth of references and quotations, which an index renders still more available for the student of Greek archæology. It is the merit of the author to have brought together passages useful for archæological illustration which occur in literature, as, for example, in a speech of Demosthenes, where readers justly engrossed by superior interests would pass them over; and then from scholiasts, onomasticons, and the like, a class of reading that editors and grammarians alone can spare time for. That the pages even when most to the purpose labour by diffuseness, need scarcely be said, though, on the whole, the reader is shown more mercy than by the contributions to the *Archäologische Zeitung* under its new direction, where diffuseness seems to be indulged in inverse ratio to the interest of the subject treated, and to the satisfactoriness of the argument.

The Campana collection has furnished the Hermitage with a pair of vases, which are described by M. Stephani as remarkable and apparently unique, in the respect that they are most strictly a pair. They are of the same form, size, and complete preservation, even to their covers. The subjects which adorn them are alike in style, the somewhat hard archaism of the fifth century B.C.; are evidently by the same hand, and present successive incidents of the same story.

An ancient combination of incidents on this principle is itself unusual; preference is usually given to the contrast which is derived from a modified parallel between incidents from different legends. In these days of revived interest in the decoration of pottery with original designs it is worth while to attend to the skill with which the reverse of each vase is subordinated to the front, variety introduced in the connexion of the front of each with its reverse, and the reserve exhibited in the contrast of the two chief subjects, and in the suppression of details not required for the main expression and sentiment in either case. We must exercise the same reserve, perforce, and summarize the conclusion for which the authorities, set forth at large in the text and notes, must here be taken for granted.

Central on one front stands the youthful Theseus, victor of the Minotaur; the vast bulk of the monster lies prostrate behind—the Minotaur certainly, by sufficient indications, though the oxhead is out of sight. Athene congratulates her hero on one side, while the prize of his conquest, Ariadne, crowns him on the other. Seven youths and maidens alternately extend round the vase, and represent the tributary band whom he rescued; they hold respectively lyres and bandlets, significant of the chorus which we learn from Plato was despatched to Delos in traditional quittance of a vow for the rescue. By the indication of this subject, the pertinence is certified of that which is central on the second vase—the earlier incident of the departure of Theseus on his perilous adventure. This is treated with peculiar delicacy and pathos; Theseus, with two spears and sword, but lightly equipped, and with the petasus that marks a traveller, extends his hand towards his father, Ægeus, who, too aged to rise, or even to erect himself as he half lies, half leans back on his chair, lifts his hand to meet his son's. There is some appearance that it is even less from bodily weakness than from the excitement of misgiving that strength and spirit fail. Between fainting father and son a maiden,—a sister as it seems,—presses forward with the eagerness of the young to give a parting embrace, and another sister behind the chair advances in sympathy. The distinct attention of Theseus to the gesture of his father as he extends his arm to meet the feebly proffered grasp, even from between the arms with which the sister is about to encircle him, is one of those touches of nature which make the whole world kin. The reverse of this vase shows a distinct and formal group engaged in the libation which was the appropriate ceremony of a departure.

In plate v. another vase from the Campana collection is engraved, which has every appearance of being the same that suggested to Flaxman his treatment of the return of Agamemnon; it had been broken in pieces in antiquity, and, when found, was carefully and completely joined together again with numerous ancient bronze rivets.

The National Museum of Great Britain contains one of the noblest collections of ancient vases in the world; and England is not destitute of students who, even since Dr. Birch has deserted Hellenic for all but exclusive devotion to Oriental antiquity, could hold their own as expositors of the styles and subjects on which their noblest interest depends; but, for all that appears, the study will now continue to owe its main advancement to the subsidized publications of the Teuton and the Muscovite. W. Watkiss Lloyd.

Fine-Art Gossip.

The Institute of British Architects has a standing committee for the preservation of ancient monuments, doubtless not those of Gothic art. We have heard with pleasure that Sir G. G. Scott has lately been added to this committee.

We understand that the noble roof of the hall at Eltham, one of the most beautiful works of its class, and famous as an example of constructive design, is in need of repairs and strengthening, which, if taken in hand at once, might prevent a downfall. A small sum would suffice to preserve this relic.

A new Art Gallery having been built in connexion with the Warrington Museum, it is intended to inaugurate it with a Fine-Art Exhibition, to be opened next month. As a fair share of the rising artists of the day are claimed as old pupils of the local school of art, notably L. Fildes, and the sculptor, Warrington Wood, whilst neighbouring collectors are freely offering their treasures, a very good gathering of pictures, sculpture, metal, and other art work may be expected. The principal object in the exhibition will be Mr. Warrington Wood's marble group of 'Michael overcoming Satan,' which was executed for the gallery, and was exhibited in the Royal Academy in 1875.

Messrs. Macmillan & Co. have in preparation, besides those already announced, the following new volumes for their "Art at Home" series: 'The Bed Room and Boudoir,' by Lady Barker; 'The Dining Room,' by Mrs. Loftie; and 'The Drawing Room,' by Mrs. Orrinsmith. All these will be profusely illustrated, and will be published in the course of the autumn.

MUSIC

Music and Musicians: Essays and Criticisms. By Robert Schumann. Translated, edited, and annotated, by Fanny Raymond Ritter. (W. Reeves.)

The popularity of Schumann's works has greatly increased in this country since the festival which took place in Bonn, in August, 1873, for the purpose of erecting a monument to the unfortunate composer in the cemetery of that university city. The musical director of Bonn, Herr Von Wasielewski, was the chief promoter of this tribute, for he was the writer of a biography of Schumann, and a most powerful worker for the musical meeting was the widow, one of the most devoted of wives as she is one of the most gifted of artistes. It was mainly owing to her deep-rooted affection for her husband that the first impetus was given here to the production of his orchestral and chamber compositions. At the Crystal Palace there were ardent admirers of Schumann, who introduced his four Symphonies, his Overtures to 'Genoveva,' 'Manfred,' 'Hermann und Dorothea,' 'Braut von Messina,' 'Julius Cæsar,' &c., and a sharp controversy followed the importation of the instrumental works. Equally warm were the conflicting criticisms when his classical chamber compositions were gradually inserted in the programmes of the Monday Popular Concerts. But, despite all opposition, the quartets, trios, and quintet (in E flat, Op. 44, piano and strings) have maintained their position in the *répertoire*. At the Musical Union the conservative feeling for the older masters predominates, for it was only in 1863, when Mr. Dannreuther first played in the Pianoforte and String Quartet in E flat, Op. 47, that Schumann's name appeared; it was a Polish pianist, M. Leschetizky (the husband of Madame Essipoff, the Russian pianist), who first took the pianoforte part in the Quintet in E flat in 1864. At the Philharmonic Society the cantata 'Paradise and the Peri' was given for the first time in England. Singularly enough, there are two other dramatic cantatas by Schumann—one a setting of scenes from Goethe's 'Faust,' and the other of Byron's 'Manfred,'—which have never been executed here in their entirety. This is the more remarkable, since 'Manfred' has not only been presented with a *mise en scène* on the German operatic stage, but it is one of the most favoured pieces at the Conservatoire concerts in Paris, and its admirable execution there has been noticed in these columns. A very miserable attempt was made last season to perform some scenes of the third part of Schumann's 'Faust' Scenes, but the failure, owing to inadequate preparation, was inevitable. The three sections, therefore, of Schumann's setting of 'Faust' and the entire score of 'Manfred' have yet to be heard in this country; when these works can be effectively executed it will be acknowledged that both productions are far more dramatic and interesting than the dull and dreary 'Paradise and the Peri.' Oriental incident has been more graphically and happily depicted by Félicien David than by Schumann, who was better able to realize the conceptions of Goethe and Byron than the dreamy aspirations of Moore.

Enough has been stated to show that Schumann now stands prominently forward here as a popular composer. His pianoforte pieces and his Lieder (chiefly his settings of Heine) would suffice to keep his name before the public. The pianists who have of late years popularized his pianoforte works are Madame Schumann, Madame Essipoff, Dr. Von Bülow, and Herr Rubinstein. When the titles of 'Kreisleriana,' 'Novelette,' 'Phantasiestück,' 'Études Symphoniques,' 'Traumeswirren,' 'Pedalstudien,' 'Humoreske,' 'Abendlied,' 'Kinderscenen,' 'Arabesques,' &c., are mentioned, what an infinite number of fanciful, fantastic, romantic, and charming scenes of the pianoforte are recalled. What a brief career for such a genius! dying in his forty-seventh year in the Endenich Asylum, near Bonn, after having attempted suicide by throwing himself into the Rhine. The sad story is simply and touchingly told by the author, who has translated all the essays and reviews published by Schumann, and who promises in a future volume to complete the selection. With due submission we will suggest that compression would be judiciously exercised. Much matter that was published in the *Neue Zeitschrift für Musik*, at Leipzig, has only a local interest; the many references to the imaginary Davidite Society could be considerably curtailed. His argumentative nature, as exemplified in the sayings of Florestan, Eusebius, Raro, &c., found vent in words of wisdom at times, but if there are sensible aphorisms, there are too often provoking platitudes. There are indications in his dreamy speculations of the influence of the mental malady which attacked him more than once. He was ambitious to found the school of "Young Germany"; he essayed to revolutionize art, but, facile as was his pen, he failed in his self-appointed mission. Indeed, it is a question whether Schumann would not have been a much greater musician had he not rushed into print. Composers who attack recklessly their contemporaries have invariably prejudiced their own position. Berlioz was an instance of the disastrous results of being a severe critic. Had he not written in the *Journal des Débats* he might living have won that fame which is being accorded to him now that he is no more. Herr Wagner, even on the admission of his most devoted disciples, has raised a host of

opponents, provoked by his unsparing abuse of his predecessors as well as of his contemporaries. Schumann was uncompromising in his views; his aim, that of exclusiveness based on nationality in music, which is cosmopolitan and speaks to the whole world, was as signal a failure as that of Herr Wagner. Schumann tried to abolish the use of Italian technical terms, phrases, and abbreviations by substituting German signs and words, and this innovation was just as unsuccessful as the divers attempts to change the Guido notation, to establish the universal musical pitch, based on mathematical vibrations, or to cause the acceptance of orchestral in place of vocal expression in the lyric drama, according to the system of Herr Wagner. The criticisms, where they bear generally on art, are worthy of preservation. Schumann did next to nothing in opera, and, therefore, he did not like Meyerbeer. His love for Herr Wagner was based on his orchestration; but the latter is censured as a conductor. No very profound affection is shown for Mendelssohn, and there was assuredly reciprocity in the feeling. Schumann has been generous and just withal as regards Berlioz, Chopin, Liszt, Henselt, Franz Hiller, Gade, Thalberg, Rubinstein, and our own English composers, John Field and Sterndale Bennett. The author in her biography states that Madame Schumann, whilst giving her approval for the translation of her husband's writings, added that she has been long occupied "with the plan of a new and correct biography; those by Wasielewski, Reissmann, and others, are wanting in many points, and partially incorrect." Such a work will be another evidence of the wife's "conjugal fidelity and maternal devotion," and will be an acceptable addition to the collection of papers left by her husband, now partly given to the world by Mrs. F. R. Ritter, of New York, whose interesting work has evidently been a labour of love.

THE THREE-CHOIR FESTIVALS.

Despite the sinister sermon preached by the Rev. Canon Barry, D.D., in Gloucester Cathedral, on the 8th of September, 1874, a discourse ostensibly delivered in aid of the Widows and Orphans of the Poorer Clergy within the Dioceses of Worcester, Hereford, and Gloucester, but really intended as a diatribe against the musical meetings, the ancient festivals of the Three Choirs to assist the clerical charities have not been extinguished. So far as Gloucester and Hereford are concerned, public opinion has completely triumphed over narrow-minded and sectarian views, and there is no danger of the charitable institutions of the three counties, and of the artistic attractions annually presented on their behalf, being at all affected by the extraordinary and ill-timed doings of the Dean and Chapter of Worcester, to suppress in their Cathedral the performance of music in its highest form,—that of the oratorio,—and from the execution thereof to exclude vocal and instrumental artists of the highest class. The failure of the choral celebration, on the 22nd and 23rd of September, 1875, artistically was decisive; not even the innovation of two sermons could console the congregation for the dulness of so-called festival services most imperfectly executed as a substitute for the sublime strains of the oratorios of Handel and Mendelssohn, and of the devotional works of Bach and Mozart; chants and anthems can be heard any day in the Cathedrals, and their numerical expansion, with only the organ as a substratum, was weak and dreary when contrasted with the recollection of the "Hallelujah" of Handel and the "Thanks be to God" of Mendelssohn from the combined and trained choralists, sustained by a powerful orchestral undercurrent. This mock festival met with the contempt it merited, and derision accompanied the indignation of the city and county at the insult offered to the lay stewards by the exclusion of famed professors. The disregard of the conscientious churchmen forming the great majority of the population of the city and county of Worcester, and the acceptance of the authority of a minute minority of so-called festival reformers, confined chiefly to members of the capitular body, were justly considered by all classes of the community as unworthy of the period of progress. To go back to 1724 as a precedent for church music in 1875 was the system of the Committee cooperating with the Dean and Chapter in their arrangements for the triennial gathering, utterly ignoring art and its advancement, and setting at defiance public opinion, at the head of which were the Bishop of Worcester, the leading county families with rare exceptions, the municipal authorities, and the masses. The people at large, from a tradition of a century and a half, gloried in the musical manifestation, which, whilst it upheld the cause of charity, was a connecting and sympathizing link with the clergy, popularizing the ecclesiastical authorities. This is not an age when priestcraft can exercise a preponderating power over the laity and dictate the class of sacred music which is to be selected for execution at the festivals, excommunicating, in fact, Handel and Haydn, Mozart and Mendelssohn, Bach and Beethoven. Not even consistency has been preserved by the Worcester clerical potentates, for one of their objections to the admission of amateurs to the festivals in the cathedral was that they secured their seats by purchased tickets. Now, only so recently as June last, at a celebration of parochial choirs in the cathedral, admission was only obtained by paid-for books of the service. We are not aware that the roof of the edifice fell upon the visitors, through the profane mode of payment; the distinction between a purchased sixpenny book and a purchased half-guinea ticket as a pass for admittance to a place of worship is subtle enough for a College of Jesuits. Money payment is exacted for the performance of parochial choirs at Worcester Cathedral, but is declared to be heresy at a festival of the Three Choirs for clerical charities. Hereford, in 1876, was the first cathedral city to set at defiance the dictum of a clerical clique at Worcester to confine the Three-Choir celebration to services, by dispensing with leading solo singers, trained choralists, and experienced instrumentalists. The memorable manifestation of 1876 at Hereford, when the mayors of the three cathedral cities attended in state, when the bishop coalesced with the dean and chapter, when names of the lord-lieutenants, the three diocesan bishops, and the leading nobility and gentry, were enrolled amongst the presidents, vice-presidents, and stewards, and when Her Majesty, the Prince and Princess of Wales, the Prince and Princess Christian, and the Duke of Cambridge, were the royal patrons, was duly recorded in the *Athenæum*. And now, in 1877, it is the turn of Gloucester to follow in the wake of Hereford to display the force of public opinion. The unprecedented number of 177 stewards has been obtained to sanction the ancient mode of celebration by a financial guarantee. Her Majesty the Queen and Prince Leopold are the patrons; the Duke of Beaufort is the president; the three lord-lieutenants and the three bishops are the vice-presidents; and the dean and chapter, disregarding the miserable and bigoted plea of desecration, have given their assent to the use of the cathedral for the amateurs to sing to the praise and glory of God during the daily services, and to listen to the professional interpretation of the most devotional as well as scientific oratorios during the week, the masterly inspirations of masterminds. It is not necessary to dwell here on the important services rendered to Art in this country through the medium of these festivals, which were indeed the pioneers of musical progress, and were the great impetus for the cultivation of sacred music through the breadth of the land by the organization of choral societies.

The programme for the 154th meeting, to be held in the Cathedral and Shire Hall of Gloucester on the 4th, 5th, 6th, and 7th of September, is full of interest. As the conductor, Mr. Charles Harford Lloyd, who is the successor to the late Dr. S. S. Wesley, as organist, directs a festival for the first time, having only officiated as pianoforte and organ accompanist at Hereford last year, it is quite natural that there should be no attempt at any prominent novelty. The selections, therefore, for the sacred productions in the Cathedral will be the 'Elijah' of Mendelssohn on the Tuesday morning (Sept. 4th); on the Wednesday morning will be the Passion service of Good Friday according to St. Matthew, by the immortal Bach, which sublime work was first disinterred by Mendelssohn in Berlin after a lapse of a century, was first given in London at the Hanover Square Rooms, on the 6th of April, 1854, through the influence of the late Sir W. Sterndale Bennett, was afterwards presented in St. Martin's Hall, St. James's Hall, the Royal Albert Hall (through Mr. Barnby), and at Exeter Hall (through Sir Michael Costa, who resuscitated the entire score). The late Dr. Wesley introduced the Passion music at the Gloucester Festival of 1871, as did the organist and conductor of the Worcester Festival in 1872. The second part of Wednesday's programme will be assigned to Beethoven's 'Mount of Olives,' absurdly called here 'Engedi.' As if this morning's programme was not sufficient for the day, Mendelssohn's 'St. Paul' and a portion of Haydn's 'Creation' will be performed on the Wednesday evening in the Cathedral. On Thursday morning (Sept. 6), there will be a miscellaneous gleaning, opening with Mr. A. Sullivan's Overture, 'In Memoriam,' followed by a Kyrie Eleison (soli and chorus), by Mr. B. Luard-Selby; next will be the German Requiem of Herr Brahms, and then the anthem, 'The Wilderness,' by Dr. S. S. Wesley. This formidable array of sacred compositions will end the first part; the interregnum of one hour for luncheon will afford time to recruit the system for the second part, the 'Hymn of Praise' of Mendelssohn. On the Friday morning, Handel's 'Messiah' will, of course, be the terminating oratorio, which work was first introduced at Gloucester at the Booth Hall, in 1757, and has never been omitted since in that city at the festivals.

Besides the above selections, the service music, morning and evening, by the Three Choirs will be of interest, and in place of the ball in the Shire Hall, as in former times, there will be a special service in the nave, during which works by our English composers, Purcell, Sir John Goss, and Mr. Gadsby will be introduced.

The secular music at the two evening concerts in the Shire Hall, of Tuesday and Thursday evenings, will include portions of 'Paradise and the Peri' by Schumann (the setting by Mr. J. F. Barnett of Moore's poem has much more animation), and Niels W. Gade's cantata, 'The Crusaders,' which was played, under the Danish composer's direction, at the Birmingham Musical Festival, on the 31st of August, 1876. The instrumental pieces at the concerts will comprise Beethoven's Symphony in c minor, Herr Wagner's 'Tannhäuser' Overture, Weber's Jubilee Overture, and two new Preludes, one by Mr. C. V. Stanford, the organist of Trinity College at Cambridge, and the other by Mr. Montague Smith. The solo instrumental displays will be Weber's Pianoforte Concertstück, by Miss Agnes Zimmermann, and Mendelssohn's Violin Concerto, by M. Sainton.

The orchestral and choral arrangements will be on the customary scale, with M. Sainton *chef d'attaque* of the band, which has been increased. Since the Prospectus has been issued it has been subjected to changes, first by the impossibility that Mdlle. Tietjens can appear, and secondly by the sudden death of Mr. G. T. Smith, of Hereford, who was to have presided at the organ. The solo singers will be Mdlle. Albani, Madame S. Löwe, and Miss Adela

Vernon, sopranos; Miss Bertha Griffiths (of Cheltenham) and Madame Patey, contraltos; Messrs. Cummings and E. Lloyd, tenors; Messrs. Maybrick and Santley, baritone-basses.

The Bishop of Gloucester will preach the sermon on the Tuesday morning, when the Mayor and Corporation will attend in state at the cathedral service. The collections at the cathedral doors are appropriated without deduction to the clergy charity, for which there are now numerous applicants, as the sad story is repeated of there being still 147 benefices within the three dioceses having only incomes below 100*l.* per annum.

Visitors to Gloucester during the Festival, independently of the musical performances and of the inspection of the magnificent cathedral, will find features of archæological attraction in the Roman Glevum and Saxon Gleaw-ceastre, whence the ancient city derives its present name; and there are pleasant excursions to be made in the vicinity, the surrounding scenery of which is varied. The views from Robin's Wood Hill will show the port and docks, the city, and the windings of the Severn. The railway arrangements for the four days on the Great Western, Midland, Bristol and Exeter, and South Wales lines afford special facilities and advantages for the holders of railway tickets.

We had written thus far when the altered programme reached us. The soprano parts in the sacred selections, originally assigned to Mdlle. Tietjens, will be sung by Miss Adela Vernon and Madame Sophie Löwe, and Madame Patey and Miss Bertha Griffiths will have additional solos at the two concerts, in place of the pieces allotted to the German *prima donna*. The Kyrie to be performed on the 6th of September was first introduced at Leipzig, where the composer, Mr. B. Luard-Selby, of Magdalen College, Oxford, and now organist of St. Barnabas, Marylebone, studied composition. Mr. Montague Smith, whose Concert Overture will be conducted by him at the concert of September 4th, is a native of Norwich, and is now organist of the English Episcopal Church in Glasgow. The closing service of Friday evening in the Cathedral, with full band and chorus, is an innovation of the new conductor. There will be no charge. Mr. C. H. Lloyd has been abstemious in the introduction of his own compositions, although so liberal towards his three brother organists of Cambridge, Glasgow, and London, for he has only scored Purcell's anthem, in which Mr. Cummings and Mr. Santley will sing. A very large attendance is expected at this Festival, despite the deprivation of the services of Mdlle. Tietjens and of the late Mr. Townshend Smith, whose successor as organist of Hereford Cathedral is Mr. Langdon Colborne; but, as he will not enter on his duties till after the Gloucester Festival, he will not take any part in it, Mr. Done, of Worcester, Mr. Hayward (deputy of Mr. Lloyd), and the conductor dividing the work at the organ and pianoforte, which would have been undertaken by Mr. Smith.

Musical Gossip.

The Welsh National Eisteddfod was commenced at Carnarvon last Tuesday, with the customary Gorsedd, held in the ruins of the Castle. The Mayor of Carnarvon presided on the opening day, and Lord Penrhyn on Tuesday. A pavilion was erected to seat 8,000 persons, and prizes to the amount of nearly 1,000*l.* were awarded to competitors in music, literature, and fine arts. The Carnarvon Choral Union won the singing prize of one hundred guineas, and a string band of the same town gained the prize in execution. Prof. Macfarren, Principal of the Royal Academy of Music, was the chairman of the umpires. The leading vocalists at the evening concert were Madame Edith Wynne and Madame Patey. Speeches were made urging the support of the Government to the new Welsh University. Mr. Owen Parry, of Bristol, won the ten-guinea prize for the best essay on the North Wales Training Ship. Mrs. Rees, of Neath, and Miss Hannah Williams were the winners of the prizes for solo singing.

Although there is nothing novel in the "argument" of the ballet of action, 'Yolande, a Dream of Far Cathay,' invented and illustrated by Mr. Alfred Thompson, it is likely to prove very attractive, for M. Jacobi's music is not only tuneful, but it is also artistic, and the terpsichorean arrangements of M. Bertrand display graceful grouping and animated action. The scenery, by Mr. A. Callcott, is alternately Italian and Japanese, and the localities have enabled Mr. A. Thompson to design costumes with brilliant hues. The management of the Alhambra Theatre cultivates ballet specially, but in no previous mounting has more novel and tasteful decoration been shown than in the Japanese *mise en scène*.

The English Opera performances at the Crystal Palace by the Rose Hersee company terminate this day (Saturday) with a performance of 'Dinorah.' Last Tuesday there was an English adaptation of Donizetti's 'Don Pasquale,' to enable Madame Rose Hersee to appear as Norina, a part well suited to her powers, as the amateurs will agree who can recall her Adina in the 'Elisir d'Amore,' when that opera was played in Italian at the Lyceum Theatre some seasons since.

The musical arrangements for the Universal Exhibition of 1878, in Paris, will be of more than ordinary interest, as the Minister of Public Instruction and of the Fine Arts has issued a decree for performances to exemplify Art in its highest forms, composition and execution; for which purpose a Commission has been nominated, under the presidency of M. Thomas, Principal of the Conservatoire; amongst the names of the members are those of MM. Gounod, Jules Cohen, Deldevez, Dubois, Guilmant, Guiraud, Halanzier, Massenet, Saint-Saëns, Weckerlin, and the leading members of the Academy of Fine Arts. The sum of 250,000 francs (10,000*l.*) has been assigned to meet the outlay for what is intended to be a musical exhibition on the grandest scale. The concerts will take place in the vast saloon of the edifice now being erected on the heights of the Trocadero. The Exposition is not to be exclusively French, it is to be essentially international as regards music, and foreign composers are to be invited to confer with the Commission as to competition and as to the acceptance of works already written.

DRAMA

Dramatic Gossip.

After 'Pierre,' by MM. Eugène Cormon and Arthur de Beauplan, with which the Vaudeville will reopen on the 5th of September, will come 'Le Club,' a three-act comedy of MM. Edmond Gondinet and Felix Cohen. The second act of this passes in a Parisian *cercle*, and no female character is accordingly introduced. French dramatists are not more apt to acknowledge obligations than their English rivals. A version of 'She Stoops to Conquer' was recently produced in Paris as a new piece. It would scarcely be surprising if 'Le Club' proved to owe something to 'Money.'

A four-act drama, by MM. Gondinet and Hector Malot, entitled 'La Belle Madame Donis,' extracted from the novel by the author last named, which appeared in *Le Siècle*, is in preparation for the Gymnase-Dramatique.

M. Mayer, under whose management the latest series of French performances were given in London, is at present in Paris, arranging for a winter season of French plays at one of the London theatres. The series will extend from November to March inclusive.

The Variétés Theatre is at present undergoing alterations amounting almost to reconstruction. It will reopen on the 1st of September with a revival of 'La Poudre d'Escampette.'

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